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CF625-B Service
CF625-C Manual

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Zhejiang CFMOTO Power Co., Ltd.
Aug. 2009

FORWARD

This manual introduces X6 EFI version(CF625-B/CF625-C) maintenance information, disassembly procedure, check & adjustment methods, trouble-shooting and technical specifications. There are illustrations, drawing to guide your operations.

Chapter 1 mainly introduces general operation information, tools, vehicle structure and basic specifications.

Chapter 2 mainly introduces check & adjustment methods and how to do vehicle maintenance.

Chapter 3 mainly introduces disassembly, installation, adjustment, maintenance and trouble-shooting information.

CFMOTO reserves right to make improvements and modifications to the products without prior notice. Overhaul and maintenance should be done according to actual condition of vehicle.

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Conversion Table

Item	Example	Conversion
Pressure	200 kPa(2.00kgf/cm^2) 33kPa (250mmHg)	1kgf/cm^2=98.0665kPa 1kpa=1000Pa 1mmHg=133.322Pa=0.133322kPs
Torque	18N・m(1.8kgf・m)	1kgf・m=9.80665N・m
Volume	419ml	1ml=1cm^3=1cc 1l=1000cm^3
Force	12N(1.2kgf)	1kgf=9.80665N

Cautions

Safety Cautions

1. Hazardous components in exhaust. Do not run the engine in a enclosed or poorly ventilated place for long time.

2. Do not touch the engine or muffler with bare hands after the engine has just stopped to avoid burns. Wear long-sleeve work clothes and gloves for operation.

3.Battery acid (dilute sulfuric acid) is highly caustic and may cause burns to skin and eyes. Flush with water if splashed to skin and get immediate medical attention. Flush with water if splashed to clothes to avoid burns. Keep battery and liquid away from reach of children

4.Anti-freeze is poisonous. Do not drink or splash to skin, eyes or clothes. Flush with plenty of soap water if splashed to skin. If splashed into eyes, flush with water and consult the doctor. If drinking the coolant, induce vomit and consult the doctor. Keep coolant away from reach of children.

5. Wear proper work clothes, cap and boots. If necessary, were dust-glass, gloves and safety glasses.

6. Gasoline is highly flammable. No smoking or fire. Also keep against sparks. Vaporized

gasoline is also explosive. Operate in a well-ventilated place.

7.When charging, Battery may generate hydrogen which is explosive. Charge the battery in a well-ventilated place.

8. Be careful not to get pinched by the turning parts like wheels and clutch.

9. When more than two people are operating, keep reminding each other for safety purpose.

Cautions for Disassembling and Assembling

1. Use genuine CFMOTO parts, lubricants and grease

3. Clean the mud, dust before overhauling

2. Store the disassembled parts separately in order for correct assemble.

4. Replace the disassembled washers, o-rings, piston pin retainer, cotter pin with new ones.

5. Elastic retainers might get distorted after disassembled. Do not use the loosened retainers.

6. Clean and blow off the detergent after disassembling the parts. Apply lubricants on the surface of moving parts. Measure the data during disassembly for correct assembling.

7.If you do not know the length of screws, install the screws one by one and make sure they are screwed in with same depth.

8.Check if the disassembled rubber parts are aged and replace if necessary. Keep the

rubber parts away from grease.

9.Pre-tighten the bolts, nuts and screws, then tighten according to the specified torque,

from big to small and from inner side to outer side.

10.Replace aged rubber parts before assembling. Do not mix volatile oil and grease on the surface,due to aggressivness of fuel and oil.

11.Apply or inject recommended lubricant to the specified parts

12.Use special tools wherever necessary.

13. When ball bearing disassembled by pressing ball ring, it can not be reused.

14.Turn the inner and outer rings of ball bearing to make sure the bearing will turn smoothly.

- Replace if any axial or radial play is found.
- If the surface is uneven, clean with oil and replace if the cleaning does not help.When pressing the bearing into the machine or to the shaft.

15.Install the one-side dust-proof bearing in the right direction. When assembling the open type or double-side dustproof bearing, install with manufacturer's mark outward.

16.Keep the bearing block still when blowing dry the bearing after washing clean. Apply oil or lubricant before assembling.

17.Install the elastic circlip properly. Turn the circlip after assembling to make sure it has been seated into the slot.

18.After assembling, check if all the tightened parts are properly tightened and can move smoothly.

19.Brake fluid and coolant may damage coating, plastic and rubber parts. Flush these parts with water if splashed.

20.Install oil seal with the side of manufacturer's mark outward.

- Do not fold or scratch the oil seal lip.
- Apply grease to the oil seal lip before assembling

21.When installing pipes, insert the pipe till the end of joint. Fit the pipe clip, if any, into the groove. Replace the pipes or hoses that cannot be tightened.

22.Do not mix mud or dust into engine and/or the hydraulic brake system.

23.Clean the gaskets and washers of the engine casing before assembling. Remove the scratches on the joint faces by polishing evenly with an oilstone.

24.Do not twist or bend the cables too much. Distorted or damaged cables may cause poor operation.

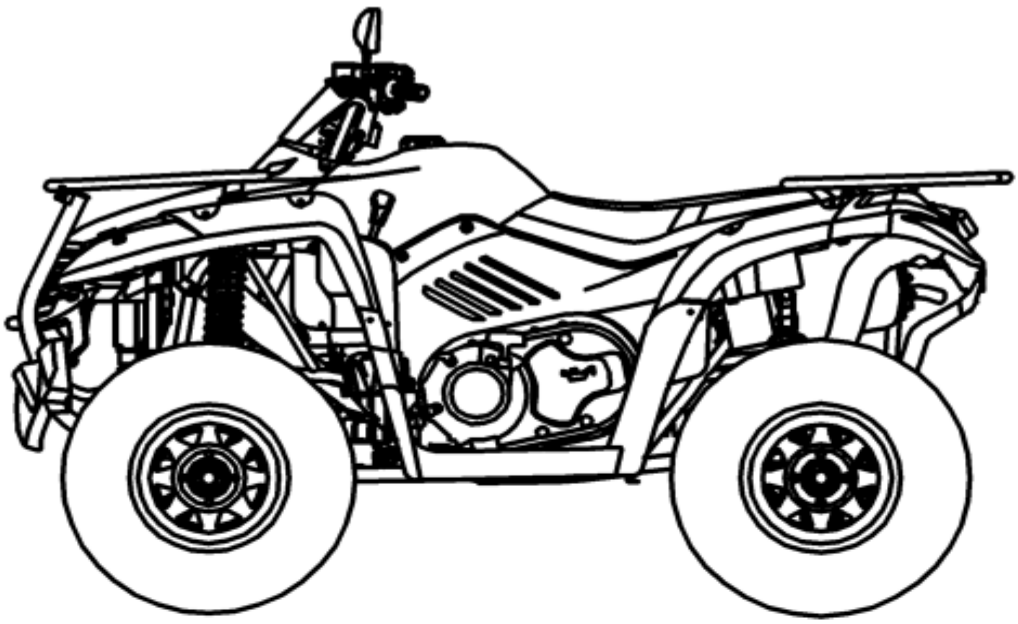
25.When assembling the parts of protection caps, insert the caps to the grooves, if any.

Numbers Marking Location

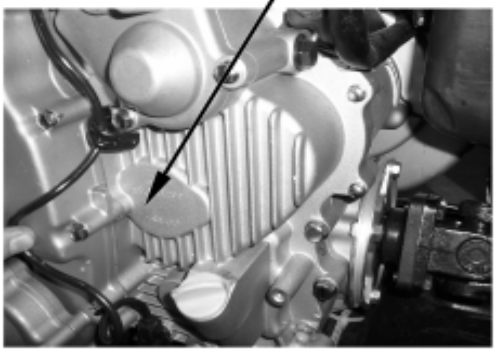
CF625-B/CF625-C

VIN Number: LCELDUS1~/LCELDUS2~

Engine Number:196S-B~



Engine Number Location



VIN Number Location

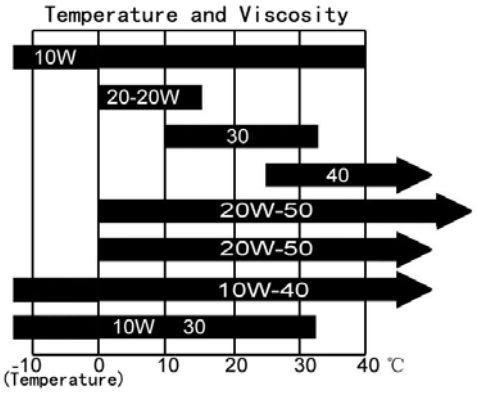
Main Data Table

Item			Parameter
Model			CF625-B/CF625-C
Length			CF625-B:2100mm CF625-C: 2300mm
Width			1180mm
Height			1230mm
Wheel base			CF625-B: 1290mm CF625-C: 1490mm
Engine type			196S-B
Displacement			CF625-B/CF625-C:594cm^3
Fuel type			Unleaded gasoline RQ-90or above
Dry weight			CF625-B: 344 kg CF625-C: 358 kg
Number of Passengers			CF625-B:1 (driver included) CF625-C:2 (driver included)
Max. Load			210 kg
Tire		Front Tire	25×8-12 40J
			185/80-12 40J
		Rear Tire	25×10-12 47J
			270/60-12 47J
Min. Ground Clearance			275mm
Turning Diameter			CF625-B:4000mm CF625-C:4750mm
Engine	Starting		Electrical starting, Manual Starting
	Engine Type		Single cylinder, 4-stroke, Liquid-cooled, 4 valves, OHC
	Combustion Chamber Type		Triangle
	Valve Driving Type		SOHC /Chain Drive
	Bore ×Stroke		196S-B: 96mm×82.0mm
	Compression Ratio		196S-B:10:1
	Lubrication Type		Pressure & Splash
	Oil Pump Type		Rotor
	Lubricant Filter Type		Full flow filter
	Oil Type		SAE15W-40/SF
	Cooling Type		Closed coolant circulation
	Coolant Type		-35℃ anti-rust anti-freeze

Item				Parameter
Fuel Device	Air Filter type			Sponge element filter
	Valve	Type		Type: CF188-B-173000
		Diameter of mixing valve		36mm
Gearing	Clutch	Wet, Auto-Centrifugal		
	Operation Mode	Automatic（CVT）+Parking & Gear Shifting		
	Gears Shift	Low Gear, High Gear & Reverse Gear		
	Shift Mode/order	Manual /L-H-N-R		
	（CVT）Transmission Ratio	2.88～0.70		
	Gear Ratio	Final Ratio	1.333（24/18，Bevel Gear）	
		Secondary Ratio	1.952（41/21）	
		Gears	Low Gear：2.25(36/16)；High Gear：1.350(27/20)；Reverse Gear：1.471(25/17)	
		Total	Low Gear5.857；High Gear：3.514；Reverse Gear：3.828	
	Axle Ratio	Front Axle	33 / 9 = 3.667	
		Rear Axle	33 / 9 = 3.667	
	Engine Output Mode		Front/Rear Shaft	
	Direction of Output Rotation		Clockwise on forward shift	
Steering Device	Steering Angle	Inner	31°	
		Outer	31°	
Brake Type		Front	Hydraulic Disc	
		Rear	Hydraulic Disc	
Bumper Device	Suspension	Swing Arm		
Frame Type		Welded Steel Tube and Plate		

Maintenance Parameters Table

Lubrication System

Item		Standard	Service Limit
Engine Oil Capacity	Volume when replacing	1900mL(2.01Qts)	—
	Volume when replacing filter	2200mL(2.32Qts)	—
Recommended Oil（See Original）  		·Specially for 4-stroke motorcycle SAE-15W-40 Substitutes must be used in the following range. API type: SE or SF grade SAE type: Choose from the left chart according to the environmental temperature	
Oil Pump Rotor	Gap between Inner and Outer Rotors	0.03～0.1mm	0.15mm
	Gap between Outer rotor and body	0.03～0.1mm	0.12mm
	Oil pressure	130-170KPa(18.85Psi-24.66Psi) at 3000RPM	

Air Inlet System

Item		Standard
Fuel Tank Capacity	Full capacity	18L(4.76Gallons)
Valve		CF188-B-173000
Inlet Pressure Sensor		CF188-B-175000
Inlet Temperature Sensor		CF188-B-177000
Air Bypass Valve		CF188-B-172000
Injector		CF188-B-171000
Idle Speed		1400±100rRPM

Cooling System

Item		Standard/Parameter		Service Limit	Remark
Full Capacity		2000ml	0.53Gallons		
Reservoir tank capacity		300ml	10.14Ounces		
Standard Density		50%			
Opening pressure of radiator cap		108kpa(1.1kgf/cm^2)	15.6Psi		
Thermostat	Initial Temperature	71±3℃	159.8 F		
	Full opening Temperature	88℃	190.4 F		
	Full opening lift range	3.5～4.5mm/95?			
Temperature and Resistance of Water Temperature Sensor	Temperature(℃)	End B Resistance(Ω)	End A C Resistance(kΩ)		
	-20	----	13.71-16.94		
	25	-----	1.825-2.155		
	50	176-280	---		
	80	63.4-81.4	0.303-0.326		
	110	24.6-30.6	0.138-0.145		
Temperature of Thermostat	Close -Open	88℃(190.4F)Round	88℃ Round	190.4F	
	Open-Close	82℃(179.6F)Round	82℃ Round	179.6F	
Coolant Type	-35℃ anti-freeze, antisepsis, high-boil coolant				

Front Wheel

Item			Standard	Operation Limit
Front Wheel	Play of wheel rim	Vertical	1.0mm	2.0mm
		Horizontal	1.0mm	2.0mm
	Tire	Groove	—	3.0mm
		Pressure	35kPa（0.35kgf / cm^2）/(5.08Psi)	—

Rear Wheel

Item			Standard	Operation Limit
Rear Wheel	Play of wheel rim	Vertical	1.0mm	2.0mm
		Horizontal	1.0mm	2.0mm
	Tire	Groove	—	3.0mm
		Pressure	30kPa（0.30kgf / cm^2）/(4.35Psi)	—

Brake System

Item		Standard	Operation Limit
Front Brake	Brake End Play	0mm	—
	Brake Disc Thickness	3.5mm	2.5mm
Rear Brake	Brake End Play	5-10 mm	—
	Brake Pedal Play	0mm	—
	Brake Disc Thickness	7.5mm	6.5mm

Battery, Charging Device, Pickup Coil

Item			Standard
AC Magneto Motor	Model		Permanentmagnet AC Type
	Output		3-phase AC
	Charging Coil Resistance(20℃)		0.2Ω-0.3Ω
	Pickup Coil Resistance		110Ω-140Ω
	Magneto without Load Voltage/(Idle Speed)		＞100V（AC），5000r/min
	Max. Output Power		300W，5000r/min
	Rated Voltage		13.5V-15.0V, 5000r/min
	Peak Voltage of Pickup Coil		＞120V
Rectifier			Three-phase annular rectification, Silicon controlled parallel-connected regulated voltage
Battery	Capacity		Capacity
	Terminal Point Voltage	Fully Charged	12.8V
		Insufficient Charged	<11.8V
	Charging Current/time	Standard	0.9A / 5～10H
		Quick	4A / 1H

Ignition Device

Item		Standard
Ignition		ECU Ignition
Spark Plug	Type	Resistance Spark plug
	Standard	DPR7EA-9(NGK)
	Optional	DR8EA ,D7RTC
	Spark plug gap	0.8-0.9mm
	Spark Characteristic	＞8mm，1mpa
Ignition Timing		BTDC10°CA 1500r/min
Ignition Coil Resistance	Initial	0.74Ω-0.78Ω
	Secondary	10.1kΩ-11.1 kΩ
Peak Voltage	Ignition Coil	＞150V
	Pulse Generator	2V
Starter Relay Coil Resistance		3Ω-5Ω
Secondary Starter Relay Coil Resistance		90Ω-100Ω

Lights, Instrument, Switches

Item		Standard
Fuse	Main	20A
	Auxiliary	10A×2 15A×2
Light, Bulb Fuse	Head Light（Hi / Lo）	12V—35W/35W×2
	Brake Light/ Tail Light	12V—5W×2
	Turning Light	12V—21W/5W
	Dashboard Indicator Light	12V—10W×4
	Indicators	φ5 LED
	Main	LCD

Air Inlet Device+ Cylinder Head **(mm)**

Item	Standard		Operation Limit
Valve Diameter	Intake	32.6	———
	Exhaust	29	———
Valve Clearance	Intake	0.05-0.10	———
	Exhaust	0.17-0.22	———
Fit Clearance between Valve Guide and Valve Stem	Intake	0.010-0.037	———
	Exhaust	0.030-0.057	———
Internal dia. of Valve Guide	Intake & Exhaust	5.000-5.012	———
Exterior dia. of Valve Stem	Intake	4.975-4.990	———
	Exhaust	4.955-4.970	———
Valve Stem Run-out	Intake & Exhaust	———	0.05
Length of Valve Stem End	Intake & Exhaust	2.9-3.1	2.3
Thickness of Valve Head	Intake & Exhaust	———	0.5
Valve Head Seal Run-out	Intake & Exhaust	———	0.03
Width of Valve Seats Seal	Intake & Exhaust	0.9-1.1	———
Length of Valve Spring	Intake & Exhaust	40	38.8
Valve Spring Tension	Intake & Exhaust	Tension182-210N /Length31.5mm	———
Cam Height	Intake	33.430-33.490	33.130
	Exhaust	33.500-33.560	33.200
Fit Clearance between Camshaft Exterior dia. &Bore.	φ22	0.032-0.066	0.150
	φ17.5	0.028-0.059	0.150
Camshaft Exterior dia.	φ22	21.959-21.980	———
	φ17.5	17.466-17.484	———
Camshaft Bore Internal dia.	φ22	22.012-22.025	———
	φ17.5	17.512-17.525	———
Camshaft Run-out	———		0.10
Rocker Arm Internal dia.	Intake & Exhaust	12.000-12.018	———
Rocker Arm Shaft Exterior dia.	Intake & Exhaust	11.973-11.984	———
Plainness of Cylinder Head Adjoining Plant	0.03		0.05
Plainness of Cylinder Head Cover Adjoining Plant	0.03		0.05

Cylinder + Piston + Piston Ring + Crankshaft (mm)

Item	Standard			Operation Limit	Remark
Cylinder Pressure	1000kPa			———	
Fit Clearance between Piston and Cylinder	196S-B:0.048-0.068			0.15	
Piston Skirt dia.	196S-B:95.960-95.980 Testing the point away skirt end 4mm			95.880	
Internal dia. of Cylinder	196S-B: 96.018-96.038			———	
Plainness of Cylinder Adjoining Plant	0.015			0.05	
Piston Ring Free Gap	Top Ring	R	11.7 round	8.9	
	2nd Ring	R	12 round	9.5	
Piston Ring Closed Gap	Top Ring		0.20-0.35	0.60	
	2nd Ring		0.15-0.30	0.60	
Piston Annular Fit Clearance	Top Ring		0.04-0.08	0.180	
	2nd Ring		0.03-0.07	0.150	
Thickness Piston Ring	Top Ring		0.97-0.99	———	
	2nd Ring		1.17-1.19	———	
Piston Annular Width	Top Ring		1.03-1.05	———	
	2nd Ring		1.22-1.24	———	
	Oil Ring		2.51-2.53	———	
Internal dia. of Piston Pin Bore	23.002-23.008			23.030	
Exterior dia. Piston Pin	22.995-23.000			22.980	
Rod Small End Inner dia.	23.015-23.020			23.040	
Rod Big End Gap	0.10-0.55			1.0	
Rod Big End Thickness	24.95-25.00				
Crankshaft Run-out	0.03			0.08	

Clutch + Transmission

(mm)

Item	Standard	Limit	Remark
Clutch Friction plate inner dia.	140.00-140.15	140.50	
Clutch Joint Rotation	1800-2400RPM	———	
Clutch engagement	3300-3900RPM	———	
Drive Belt Width	35.2	33.5	
Driven Disc Spring Free Length	168	160	
Shifter and fit flute gap	0.10-0.40	0.50	
Left Shifter Sliding Thickness	5.8-5.9	———	
Right Shifter Sliding Thickness	5.8-5.9	———	
Plunging Flute Width	6.0-6.2	———	
Driven Output Gear Sliding Width	6.0-6.2	———	

Tightening Torque

Item	Torque N·m(kgf·m)	Item	Torque N·m(kgf·m)
5mm Bolt, nut	5(0.5)	5mm Screw	4(0.4)
6mm Bolt, nut	10(1.0)	6mm Screw	9(0.9)
8mm Bolt, nut	22(2.2)	6mmSH Bolt with flange,	10(1.0)
10mm Bolt, nut	34(3.5)	6mm Bolt with flange, nut	12(1.2)
12mm Bolt, nut	54(5.5)	8mm Bolt with flange, nut	26(2.7)
		10mm Bolt with flange, nut	39(4.0)

For others not listed in the chart, refer to the standard tightening torque.
Notes: Apply some engine oil on the part of screw thread and adjoining surface

Item	Thread Dia. (mm)	Quantity	Torque N·m(kgf·m)	Remark
Upper Front Mounting Bolt, Engine	M8×60	1	16～20	
Upper Rear Mounting Bolt, Engine	M10×1.25×110	1	40～50	
Upper Rear Mounting Bracket Bolt, Engine	M8×14	1	16～20	
Upper Front Mounting Bracket Bolt, Engine	M8×14	1	16～20	
Low Mounting Bolt, Engine	M12×1.25×140	2	50～60	
Bolt, Swing Arm	M10×1.25×70	16	40～50	
Bolt, Rear Absorber	M10×1.25×50	4	40～50	
Bolt, Front Absorber	M10×1.25×50	4	40～50	
Bolt, Rear Wheel Shaft Holder	M10×1.25×100	4	40～50	
Mounting Nut, Rim	901-07.00.02 M20	16	50～60	
Nut, Rim Shaft	901-07.00.03 M10	4	110～130	
Mounting Screw, Rear Brake Caliper	M6×25	2	18～22	
Bolt, Rear Brake Caliper	M10×1.25×20	2	40～50	
Bolt, Front Brake Disc	901-08.00.03 M8×	8	25～30	
Bolt, Front Brake Caliper	M8×14	4	16～20	
Locknut, Steering Stem	M8×55	4	16～20	
Nut, Steering Stem	M10×1.25	4	40～50	
Locknut, Steering Shaft	M14×1.5	1	100～120	
Rear Mounting Bolt, Muffler	M8×30	1	16～20	
Bolt, Exhaust Pipe	M8×14	1	16～20	
Mounting Bolt, Exhaust Pipe	M8×40	1	16～20	
Mounting Bolt, Rear Axle	M10×1.25×110	2	40～50	
Mounting Bolt, Front Axle	M10×1.25×90	1	40～50	
Mounting Bolt, Front Axle	M10×1.25×25	2	40～50	
Back End Bolt, Rear Trans Shaft	901-30.00.01	6	40～50	
Front End Bolt, Rear Trans Shaft	901-29.00.01	4	35～45	
Bolt, Front Trans Shaft	901-29.00.01	8	35～45	
Thermo Switch	CF250T-420500	1	9～12	
Mounting Bolt 1, Front Rack	M8×14	2	35～45	
Mounting Bolt 2, Front Rack	M6×12	2	25～30	
Mounting Bolt , Rear Rack	M8×14	4	16～20	

Engine Tightening Torque Table

Item	Q'ty	Screw dia.（mm）	Torque （N.m）	Remark
Sensor, Reverse Gear	1	M10×1.25	20	
Spark Plug	1	M12×1.25	18	
Water Temperature Sensor	1	Rc1/8	8	Apply screw thread sealant
Valve Clearance Adjusting Nut	4	M5	10	
Drive Disc Nut	1	M20×1.5	115	
Driven Disc Nut	1	M20×1.5	115	
Circle Nut, Driving Disc	1	M30×1	100	
Nut, Front Output Shaft	1	M14×1.5	97	
Nut, Drive Bevel Gear	1	M22×1	145	
Nut, Driven Bevel Gear	1	M16×1.5	150	
Fixing Nut, Clutch	1	M18×1.5	70	Left handed
Limiting Nut, Driven Bevel Gear Shaft	1	M60	110	Apply screw thread sealant
Limiting Nut, Front Output Shaft	1	M55	80	Apply screw thread sealant, left handed
Bolt, Swing Arm Shaft	2	M14×1.25	28	
Drain Bolt	1	M12×1.5	30	
Mounting Bolt, Overriding Clutch	6	M8	26	Apply screw thread sealant
Mounting Bolt, Magneto Stator	3	M6	10	Apply screw thread sealant
Bolt, CVT Windshield	3	M6	10	Apply screw thread sealant
Link Bolt, Oil Pipe	2	M14×1.5	18	
Mounting, Oil Pump	3	M6	10	
Mounting Bolt, Pressure Limiting Valve	2	M6	10	
Bolt, Drive Bevel Gear Cover	4	M8	32	
Bolt, Driven Bevel Gear Cover	4	M8	25	
Locating Bolt, Shift	1	M14×1.5	18	
Flange Bolt, Fan	1	M10×1.25	55	

To be continued

Item	Quantity	Diameter（mm）	Torque （N.m）	Remark
Bolt, Crankcase	14	M6	10	
	3	M8	25	
Bolt, Driven Sector Gear	1	M6	12	
Mounting Bolt, Oil Filter	1	M20×1.5	63	
Oil Filter	1	3/4?（16 /in	18～20	
Bolt, Starting Motor	2	M6	10	
Bolt, Cylinder Head	4	M10	46	
Bolt, Cylinder Head(2 sides)	2	M6	10	
	1	M8	25	
Upper and Lower Bolt, Cylinder	4	M6	10	
Bolt, Cylinder Head Cover	12	M6	10	
Bolt, Chain Tensioner	2	M6	10	
Nut, Chain Tensioner	1	M8	8	
Bolt, Radiator Fan	3	M6	10	
Thermostat Bolt	2	M6	10	
Bolt, Water Pump Cover	3	M6	6	
Mounting Bolt, Water Pump	2	M6	10	
Fixed Bolt, Timing Sprocket	2	M6	15	Apply screw thread sealant
Bolt without remarks		M5	4.5-6	
		M6	8-12	
		M8	18-25	

Engine Tools

Measuring Tools				
No	Name	Type	Function	Remark
1	Vernier Calipers	0-150mm	Measure length and thickness	
2	Micrometers	0-25mm	Measure the outer diameters of swing arm, valve rod and camshaft	
3	Dial gauge	25-50mm	Measure max. lift range of camshaft	
4	Dial gauge	75-100mm	Measure piston skirt	
5	Inner dia. Gauge, Cylinder		Measure inner dia. of cylinder head	
6	Inner dia. Gauge,	10-34mm	Inner dia. of swing arm, piston pin hole, and rod head hole	
7	Dial Test Indicator	1/100	Run-out	
8	Knife Straight Edge		plainness	
9	Feeler Gauge		Plainness, adjusting valve clearance	
10	Fuel Level Gauge		Fuel level length of carburetor	
11	Plastic gauge		Fit clearance	
12	pull tension gauge		Spring bounce	
13	Tachometer		Engine rotation rate	
14	Cylinder Pressure Meter		pressure in cyclinder	
15	Oil Pressure Gage		Oil pressure	
16	Barometer		Opening pressure of radiator cover	
17	Ohmmeter		Resistance and voltage	
18	Amperemeter		Opening of currency / switch	
19	Thermometer		Liquid temperature	
20	Timing Lights		Test spark timing	
21	Torque Tester	One Set	Tightening torque	
Auxiliary Measuring Instrument				
22	Alcohol Burner		Warming up	
23	Magnet Stand		Install dialgauge	
24	Slab		Auxiliary measure supplementary	
25	V-Block		Run-out supplementary	
26	Forcep		Install valve clip	
27	Plier		Disassemble and install circlip	
28	Joint Plier		Disassemble and install flange	
29	Impact Driver		Disassemble cross recessed bolt	
30	Slot Type Driver			
31	Cross Type Driver			

Special Purpose Tools

No	Name	Type	Function	Remark
1	Spark Plug Wrench	172MM-022400-922-004	Disassemble/ install spark plug	
2	CVT Wrench	CF188-051000-922-001 CF188-052000-922-001	Disassemble/install CVT drive/driven disc nut	
3	Oil Filter Wrench	CF188-011300-922-001	Disassemble/ install oil filter	
4	Piston Pin Remover	CF188-040004-922-002	Disassemble piston pin	
5	Magneto stator Remover	CF188-031000-922-001	Disassemble magneto stator	
6	Crankcase Dissociator		Divide L/R crank case	
7	Crank Remover		Disassemble crank shaft from left crankcase	
8	Crank Tool		Install crank shaft on left crankcase	
9	Valve Spring Compressor	CF188-022006-922-001	Disassemble/ install valve spring	
10	Valve Former	CF188-022004-922-001	Grind valve	
11	Circle Nut Wrench	CF188-052000-922-003	Disassemble CVT driven disc	
12	Driven Disc Clamp	CF188-052000-922-004	Disassemble CVT driven disc	
13	Driven Disc Former	CF188-052000-922-002	Disassemble CVT driven disc	
14	Limiting nut Wrench	CF188-062204-922-001	Disassemble driven bevel gear bearing limiting nut	
15	Bearing Tool	One full set	Install bearing and oil ring	
16	Bearing Remover	One full set	Disassemble bearing	
17	Oil Ring Remover		Disassemble bearing	
18	Limiting Nut Wrench	CF188-060008-922-001	Disassemble front output shaft bearing limiting nut	
19	PDA		Diagnose failures of EFI system	
20	Oetiker Clamp Catcher		Disassemble/ install fuel Pipe	
21				
22				
23				
24				
25				

Lubricant Grease, Sealant

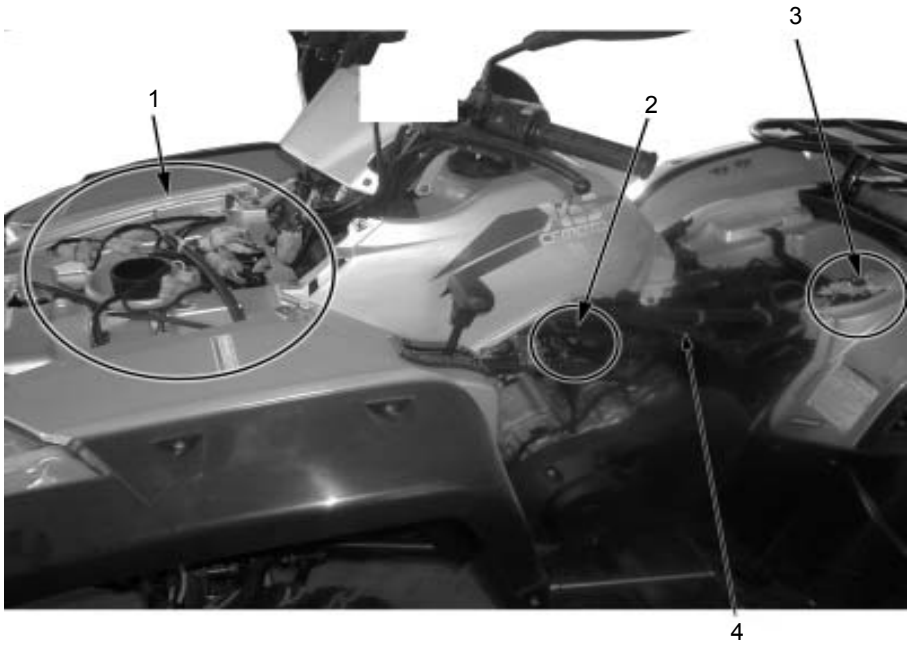
Coated Section	Attention	Grease
Turning Bearings Throttle Cable Connecting Portion Throttle Pedal Movable Parts Brake Pedal Movable Parts Swing Arm Movable Parts Steering Inner Circle Surface Seat Lock Movable Parts Transmission Movable Parts		Multi-purpose grease

Operation Material and Installment Supplementary of Engine

Engine operation materials include lubricant (oil), grease (lubricant grease) and coolant, installment supplementary includes plane sealant and screw thread sealant.

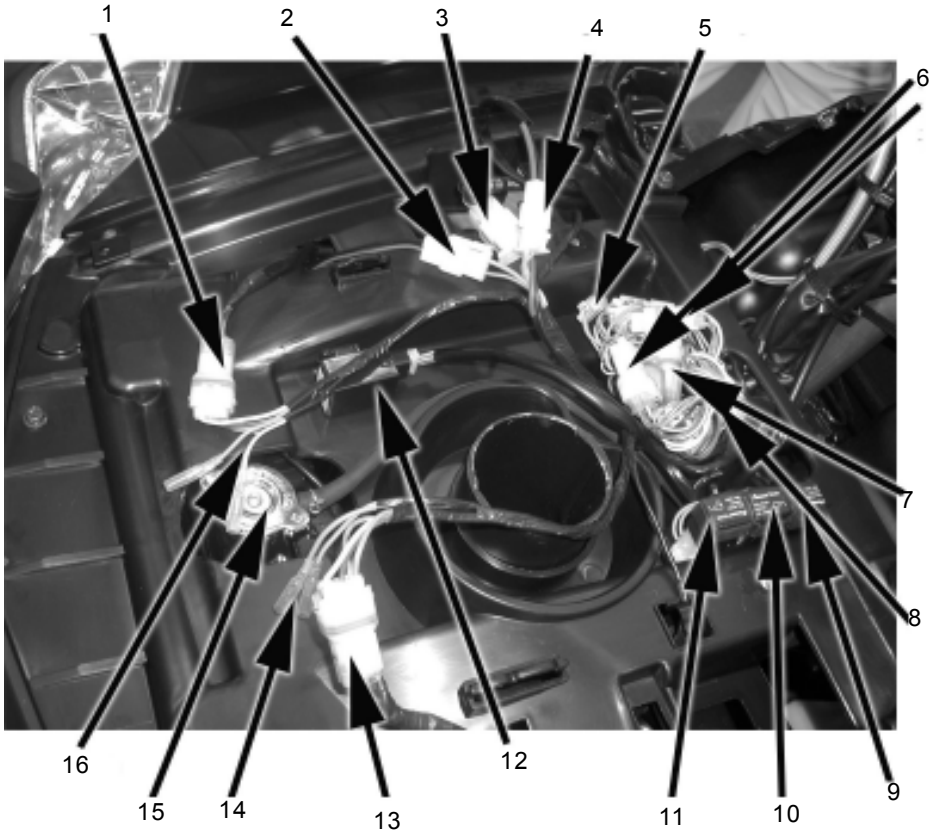
Name	Type	Parts	Remark
lubricant /oil	Specially for 4-stroke motorcycle SAE-10W-40、20W-50 Substitutes must be used in the following range. API type: SE or SG grade （Replacement see 1-3）	Rotating section and carriage in cylinder, Rotating section and carriage in crankcase Rotating section and carriage in cylinder head See Lubrication Systems Diagram（5-14）	capacity 2200m L(2.32Qts)(replace oil) 2300 m L(2.43 Qts)（replace oil filter） 2600 m L(2.75Qts)（engine overhaul）
Lubricant with molybdenum		Piston pin, valve rod part, valve ring, cam shaft	
Grease/lubricant grease	# 3 MoS_2 lithium based grease	Oil seal lip, O ring and other latex sealing, bearing with seals, and CVT bearing/housing	
Coolant	-35℃ anti-freeze, anti-rust, high –boiled coolant	Cooling system, water seals	Capacity based on radiator pipe system
Plane sealant		Coupling surfaces of cases, cases and cylinder, cylinder head and cylinder head cover	
Screw thread sealant		Some screw thread	

Wiring, Pipes, Cable Layout



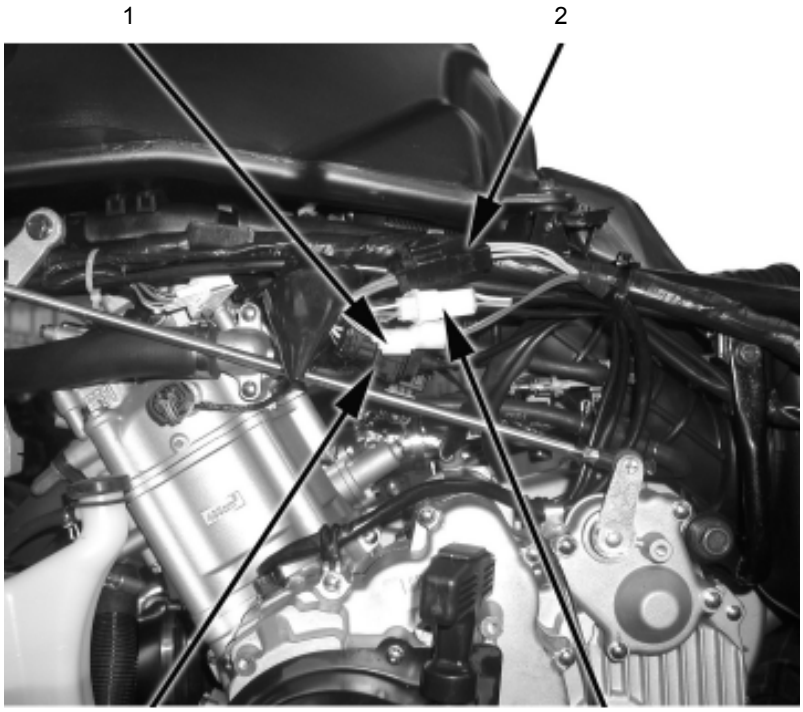
1.Plug-in on Front Fender (See Pic 1) 2.Wirings in Middle Section (See Pic 2) 3.Plug-in on Rear Fender (See Pic 3) 4.Main Cable

Picture 1



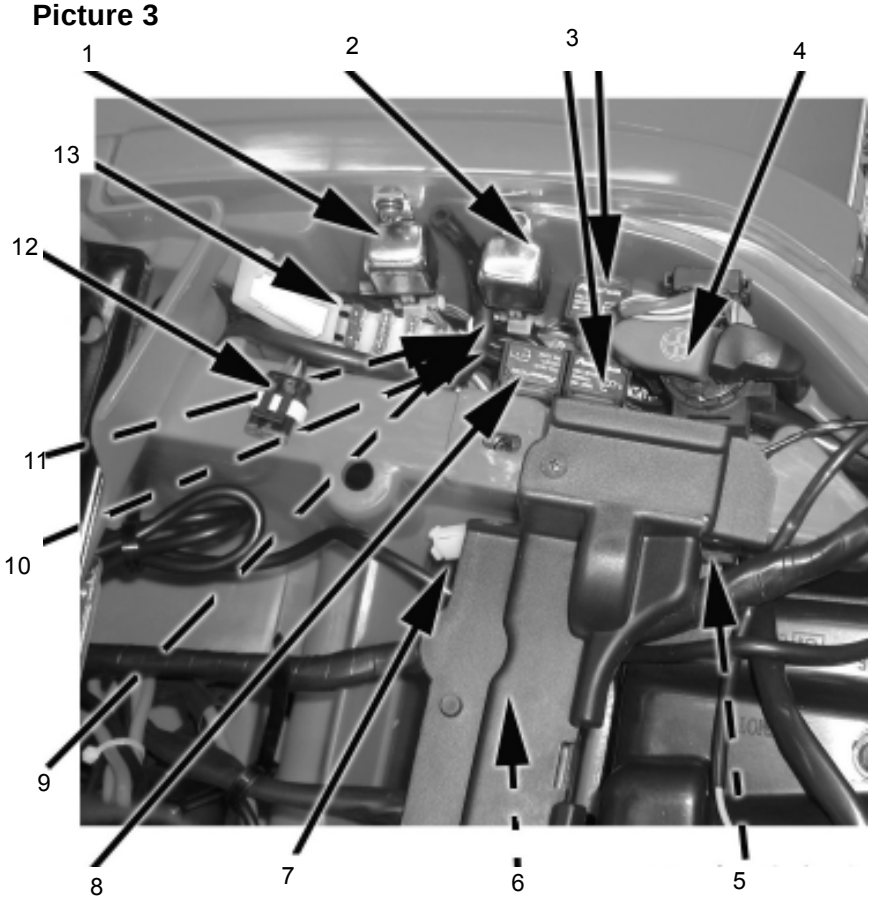
1.Front RH Headlight Plug-in 2.Fan Plug-in 3.Ignition Switch Plug-in 4.Backup Power Plug-in 5.Fuel Sensor Plug-in 6.LH&RH Handlebar Switch Plug-in 7.2WD/4WD Switch Plug-in 8.Dashboard Plug-in 9.2WD/4WD Switch Realy 10.4WD Locker Relay 11.Brake Light Relay 12.Flasher 13.LH Headlight Plug-in 14.Front LH Turn Signal Plug-in 5.Radiator Cap 16.Front RH Turn Signal Plug-in

Picture 2

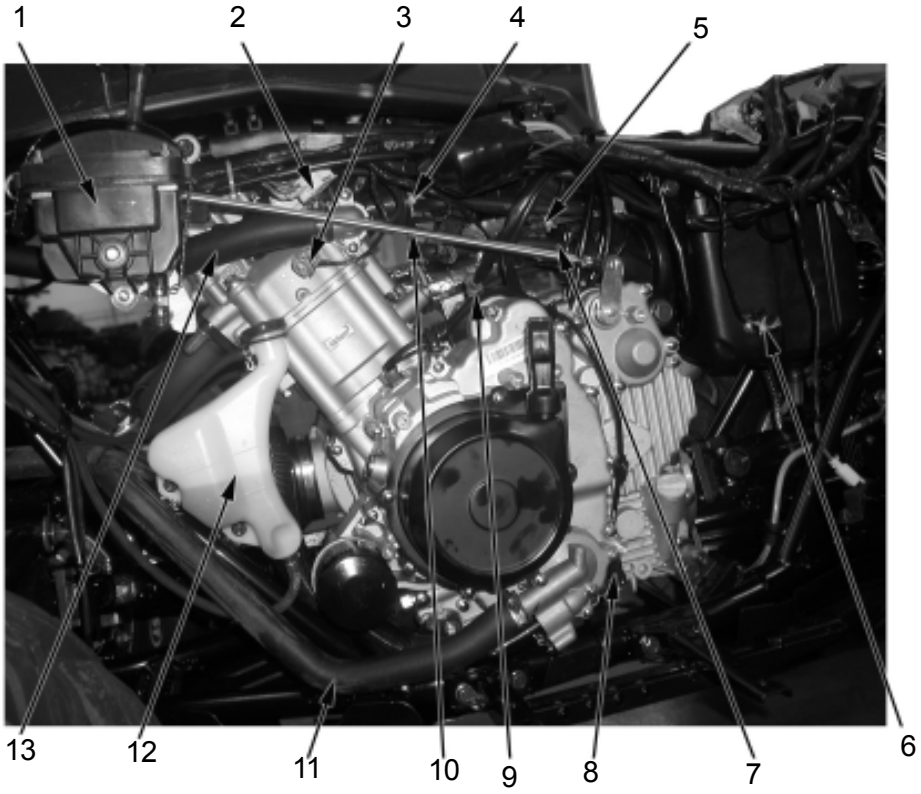


1.Trigger Coil Plug-in 2.Magneto Plug-in 3.Speedometer Sensor Plug-in 4.Shift Switch Sensor Plug-in

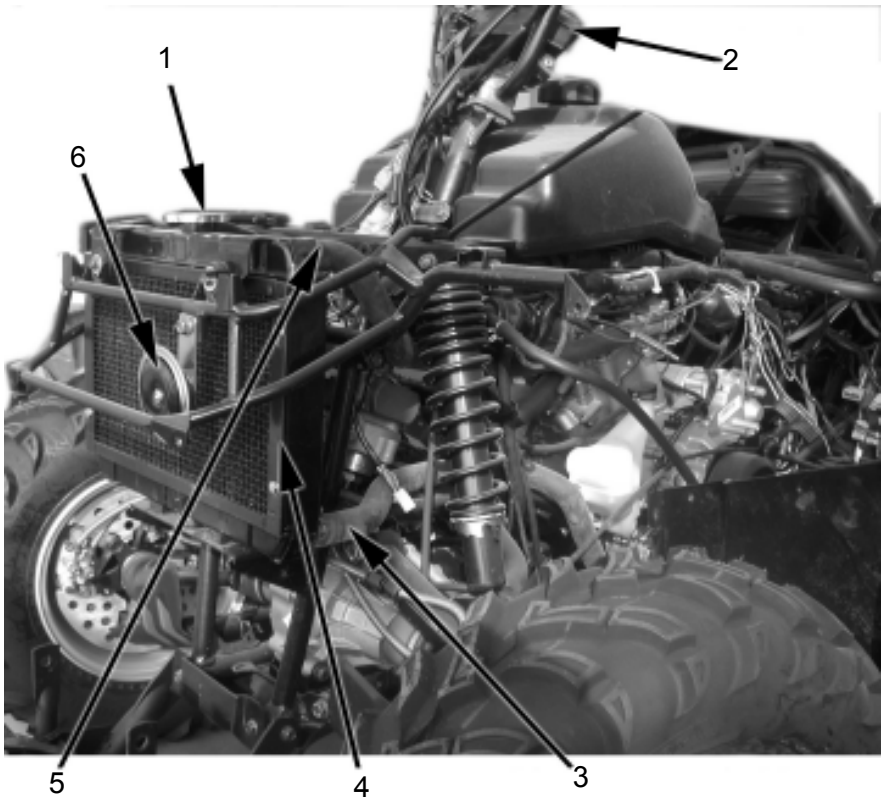
Picture 3



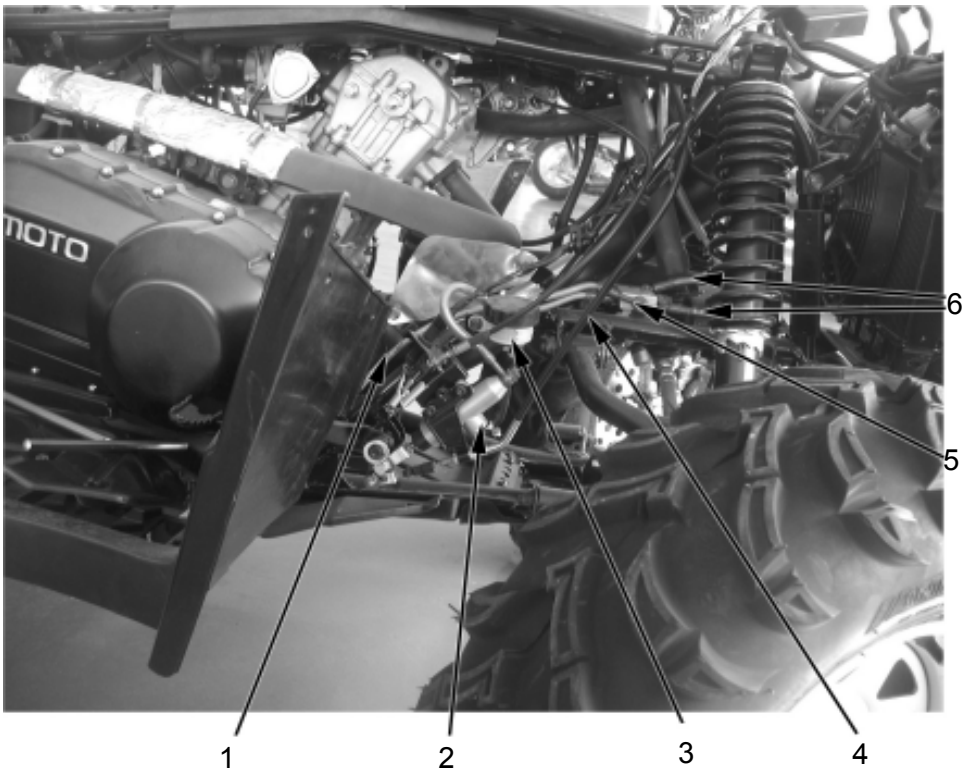
1.Fan Plug-in 2.Headlight Plug-in 3.Start Servo- Relay 4.Start Relay 5.Parking Brake Plug-in 6.Battery
7.Clock Setting Plug-in 8.Fuel Pump Relay 9.Oxygen Sensor Heat Fuse 10.Parking Position Diode
11.Neutral Position Diode 12.Troubleshooting Plug-in 13.Fusebox Plug-in



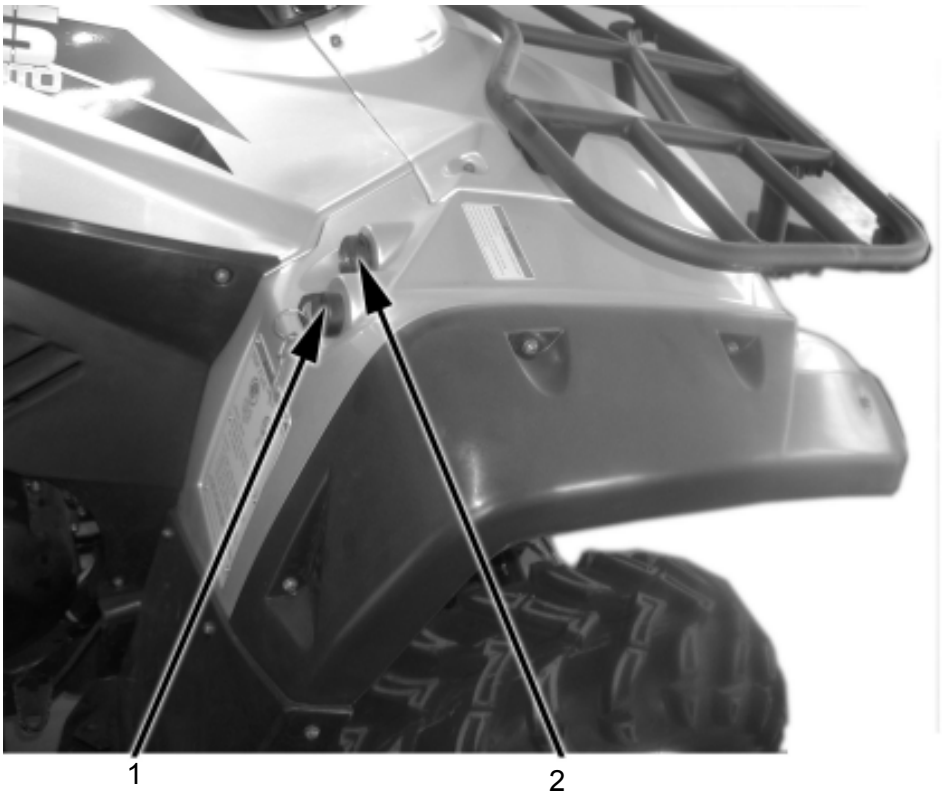
1.Gear Shift Mechanism 2.Oxygen Sensor Plug-in 3.Water Temp Sensor 4.Throttle Body
5.MAP Sensor 6.IAT sensor 7.Idle Air Control Valve 8.Speedometer Sensor 9.Starting Motor
10.Shift Rod 11.Radiator Water Outlet Hose 12.Reservoir Tank 13.Radiator Water Inlet Hose



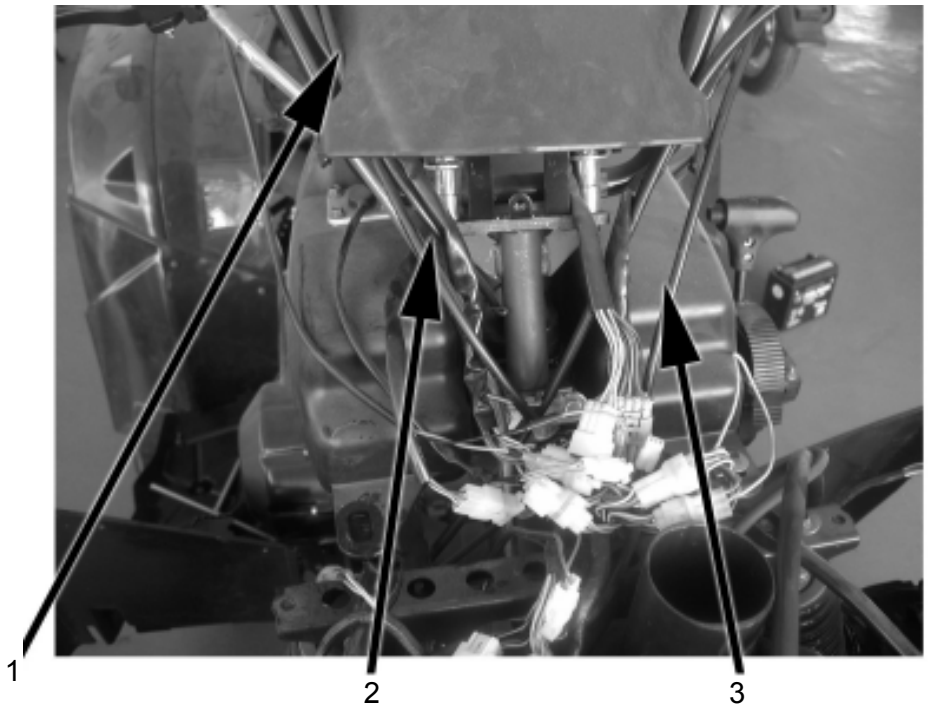
1.Radiator Cap 2.Dashboard 3.Radiator Water Outlet Hose 4.Radiator
5.Radiator Water Outlet Hose 6.Horn



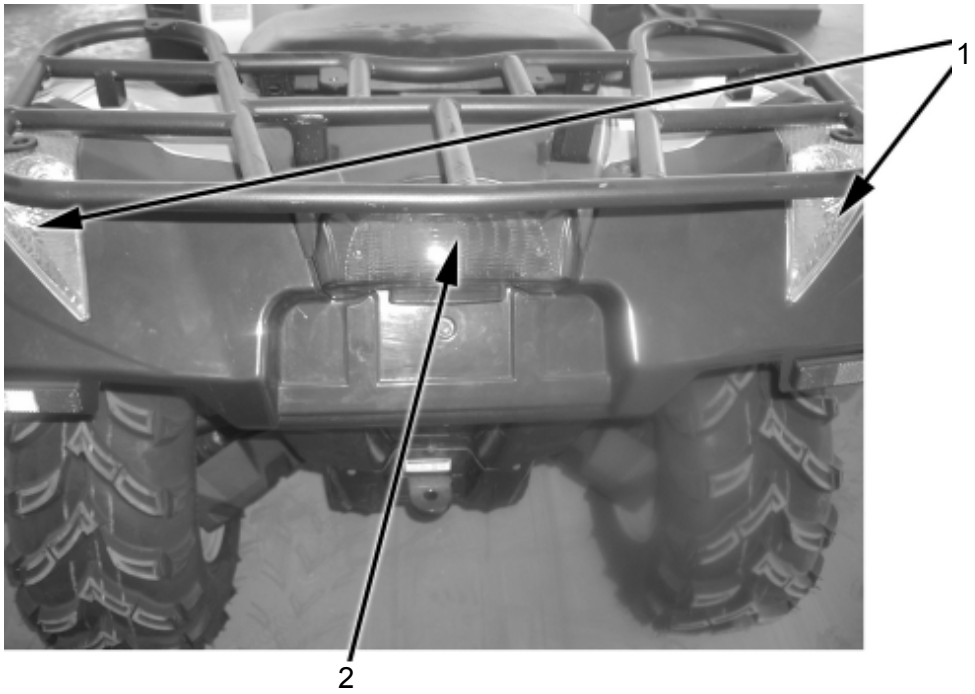
1.Rear Brake Hose 2.Master Cylinder 3.Brake Fluid Reservoir 4.Brake Cable
5.Four-way Connector 6.Front Brake Hose



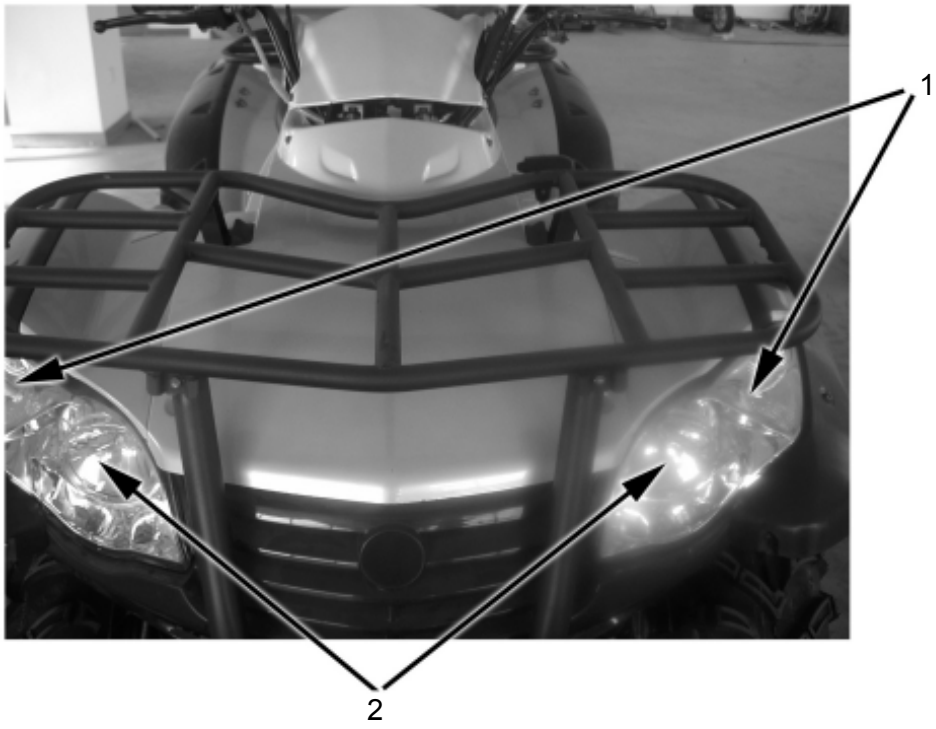
1.Ignition Switch 2.Back-up Power Plug-in



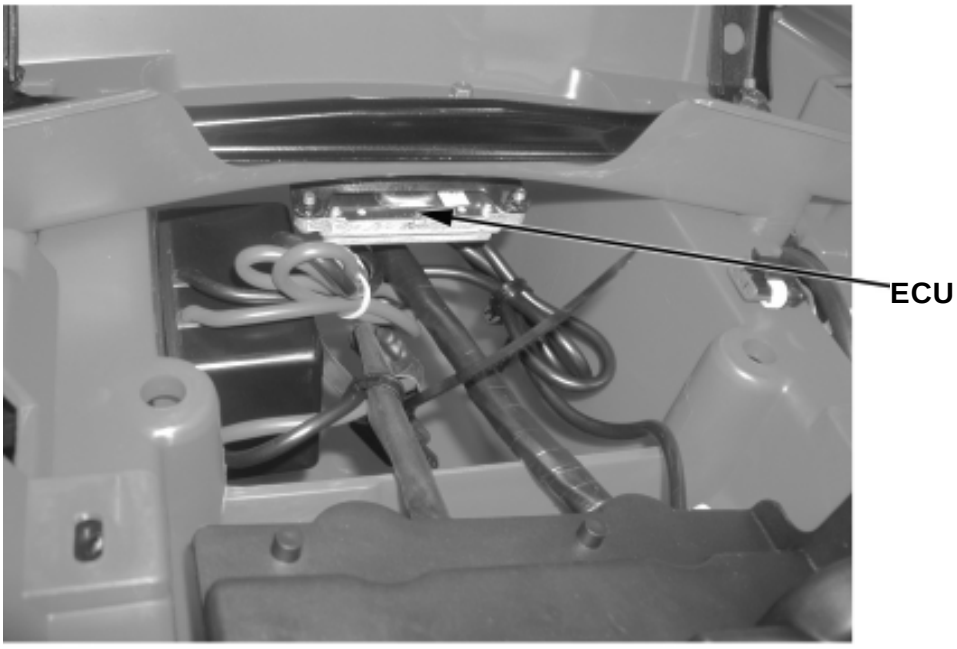
1.Parking Cable 2.Throttle Cable 3.Choke Cable



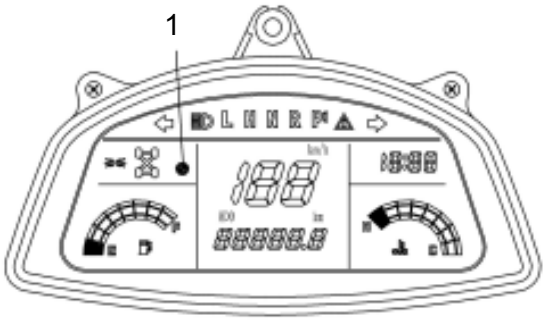
1.Rear Turn Lights 2.Taillight



1.Front Turn Lights 2.Headlights



Failure Indicator

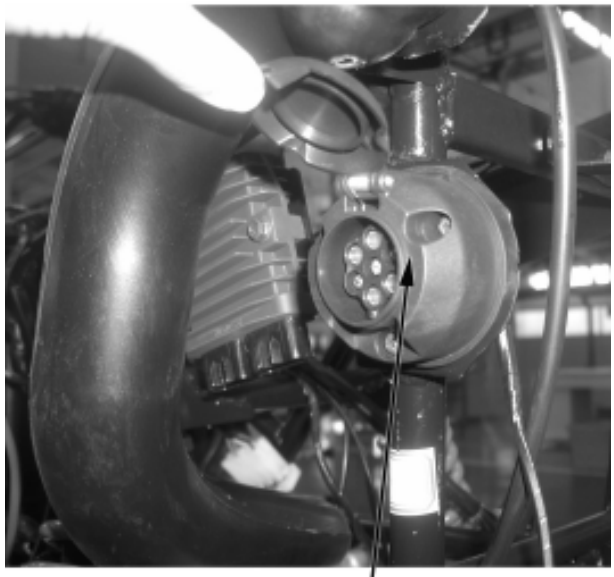


Failure Indiactor is located on the left top"1"of instrument.

While the indicator flashing is faulty, failure uses 4-digit flashing.
For example:0650,
"0" flashes 10 times,
"6" flashes 6 times,
"5" flashes 5 times,
"0" flashes 10 times,
See (Page 11-27) for the meaning of Diagnostic Trouble Code.
While failure appears, use PDA to diagnose it.
Connect PDA with PDA connector, the location of PDA connector (see Page 1-19) Picture 3. the use of PDA (see Page 11-26).

Power Output Socket

Output Voltage:DC12V
The power only supply for the rear turning light, taillight and rear registration plate lamp of the trailer.



Overhaul Information

Operation Cautions

WARNING:

Gasoline is highly flammable, therefore smoke and fire are strictly forbidden in the work place. Special attention should also be paid to sparks. Gasoline may also be explosive when it is vaporized, so operation should be done in a well-ventilated place.
Remove and Install muffler after it is fully cold.

- This chapter is on the disassembly and installation of rack, visible parts, exhaust pipe, muffler and fuel tank.
- Hoses, cables and wiring should be routed properly.
- Replace the gasket with a new one after muffler is removed.
- After muffler is installed, check if there is any exhaust leakage.

Tightening Torque

Muffler Rear Fixing Bolt: 35-45**N.m**
Muffler Exhaust Pipe Bolt: 35-45**N.m**
Muffler Body Fixing Bolt: 35-45**N.m**

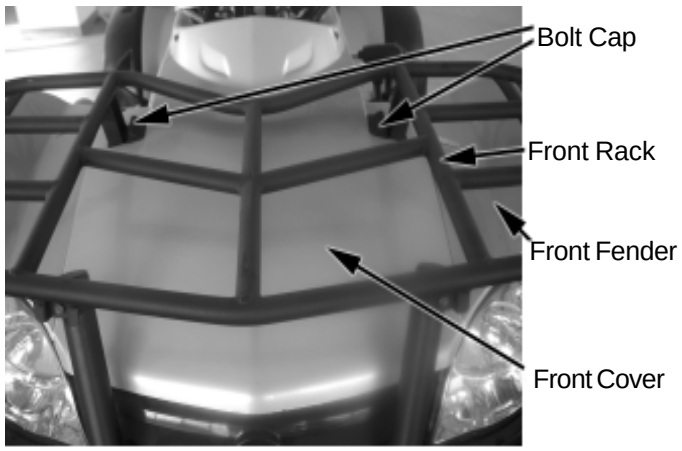
Troubleshooting

Loud exhaust noise
- Broken muffler
- Exhaust leakage

Insufficient power

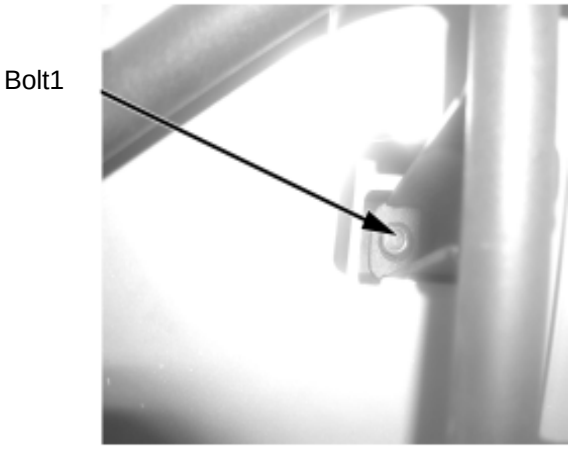
- Distorted muffler
- Exhaust leakage
- Muffler clogged

Front Rack, Bolt Cap



Remove:

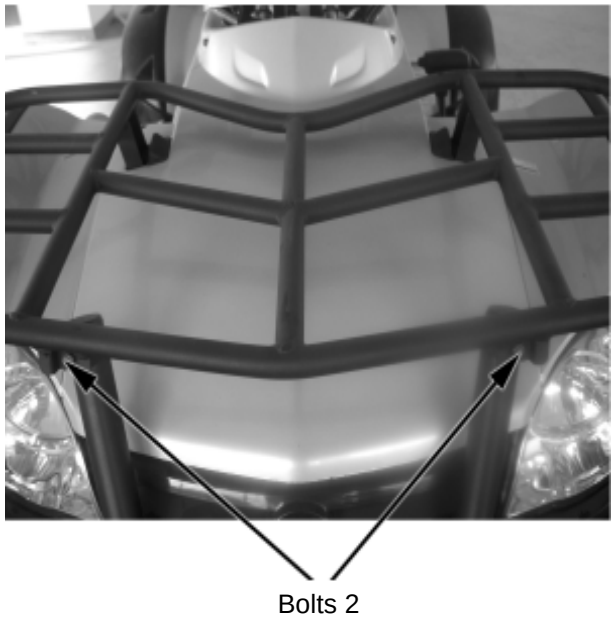
Remove bolt caps;
Front rack bolts can now be seen.



Remove fixing Bolt 1.
(one for each on the left and right.)

Remove fixing Bolt 2;

Remove front rack.

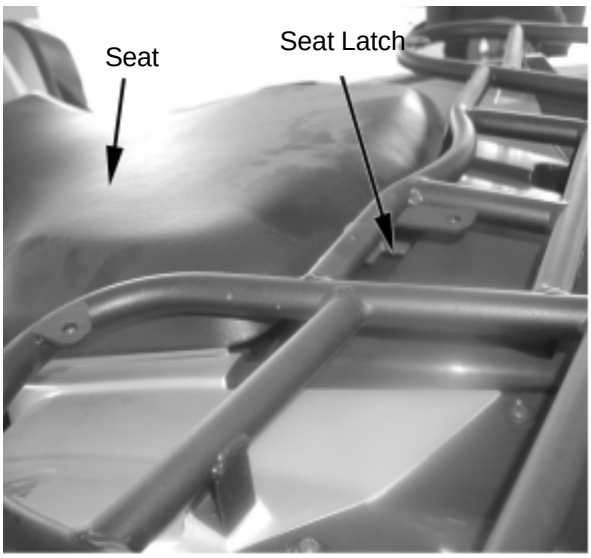


Installation:

Reverse the removal procedure for installation
Tightening Torque:
Fixing Bolt 1, Bolt 2 35 N.m -45**N.m**

Fixing Bolt 3, Bolt 4 25 N.m -30**N.m**

Seat



Remove:

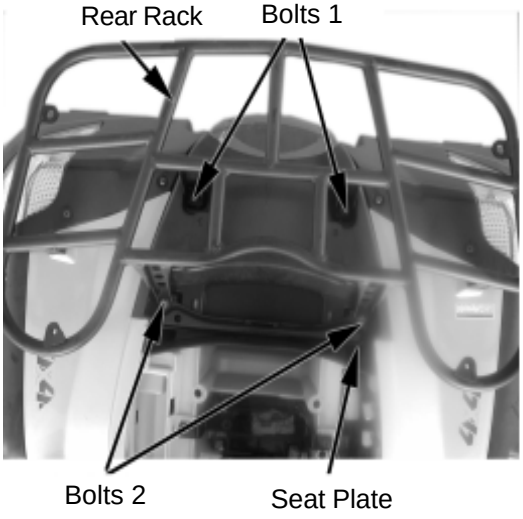
Pull upward seat latch;
Lift and push seat backward.

Installation:

Press upward seat latch;
Press seat forward and down.

NOTE:

Shake seat left,right, front and back to make sure that the seat is firmly installed.

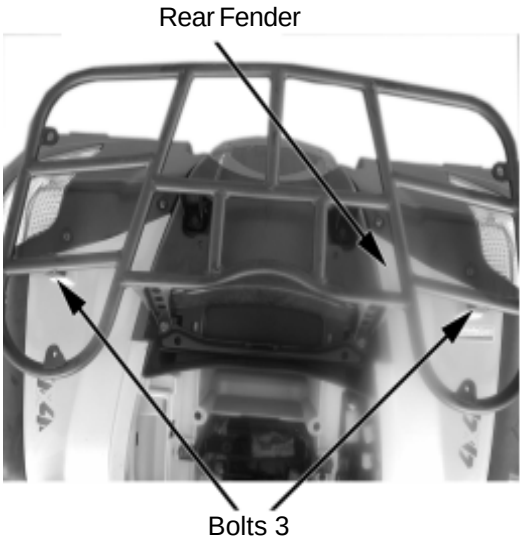


Remove:

—Seat (→2-3)

—Bolt 1, bolt 2

Remove seat support.



Remove Bolt 3 for rear rack and rear fender from rear fender bottom;
Remove Bolt 1;
Remove Rear Rack.

Installation:

Reverse the removal procedure for installation.

Tightening Torque：
Bolt 1：35N • m-45**N • m**
Bolt 2：35N • m-45**N • m**
Bolt3：8N • m-12**N • m**

Front Top Cover

Remove:

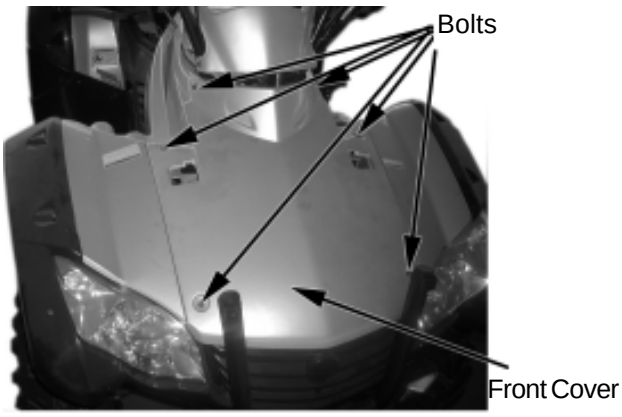
Front Rack（→2-2）

6 nuts;

Front Top Cover.

Assemble:

Reverse the removal process and direction.



Dashboard Cover

Remove:

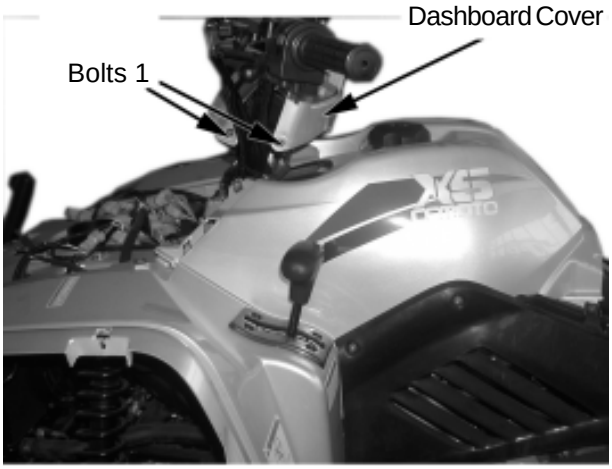
--2 pieces Bolt 1

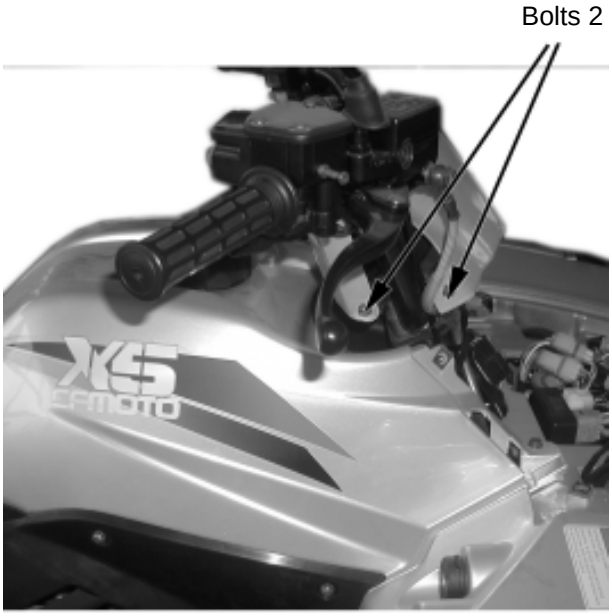
--2 pieces bolt 2

--Dashboard Cover

Installation:

Reverse the removal process and direction for installation.





Front Side Support(Left)

Remove:

Bolt 1;

Front Side Support.

Assemble:

Reverse the removal process and direction.

Bolts 1

Front Side Support,LH

Front Side Support(Right):

Same as Left Side Support.

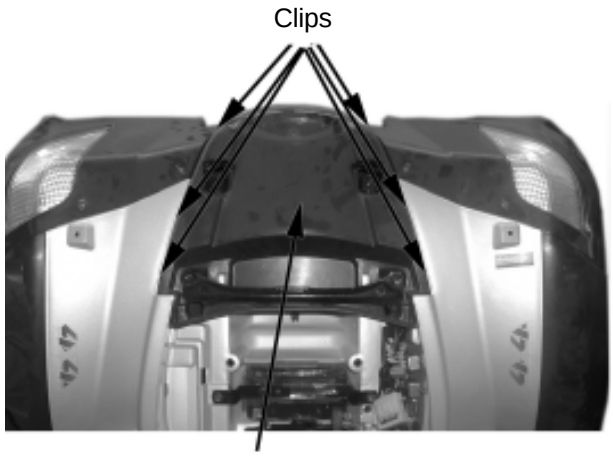
Rear Top Cover

Remove:

Rear Rack (→ 2-3)

Seperate clasps of rear top cover from rear fender;

Remove Rear Top Cover



Installation:

Reverse the remove procedure and direction for installation .

Gear Shift Unit Fender

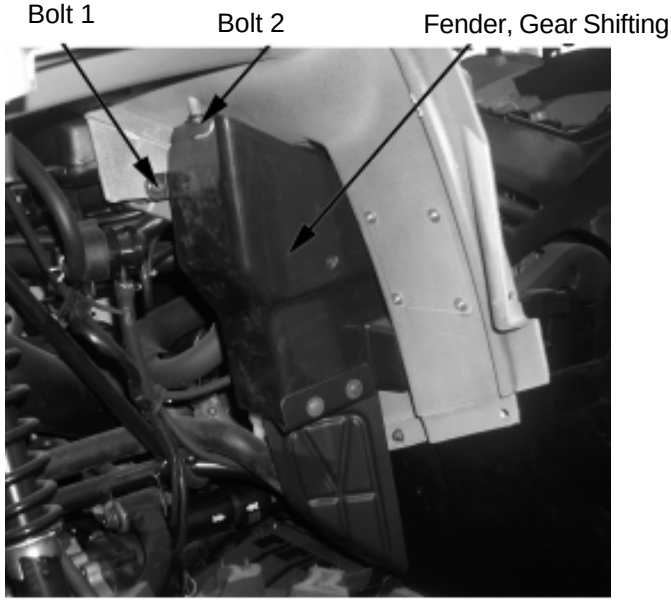
Remove:

--Bolt 1

--Bolt 1

--Bolt 2

Remove Gear Shift Unit Fender.



Installation:

Reverse the remove procedure and direction for installation .

Left Side Cover

Remove:

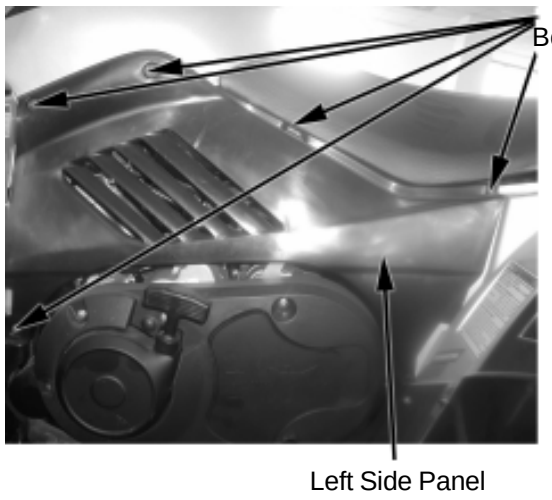
--Seat(→ 2-3)

--Left Side Cover Bolt

--Left Side Cover

Installation:

Reverse the remove procedure and direction for installation .



Rear Protector

Remove:

--Rear Rack（→ 2-3）

--Rear Top Cover（→ 2-6）

--Rear Link Plate（→ 2-7）

--Rear Left Side Support（→ 2-8）

--Rear Right Side Support（→ 2-8）

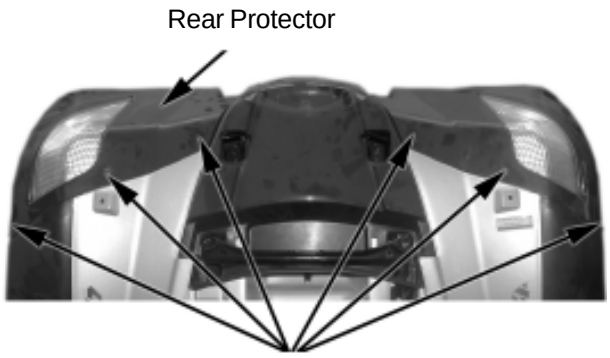
--Rear Turning Light Connector

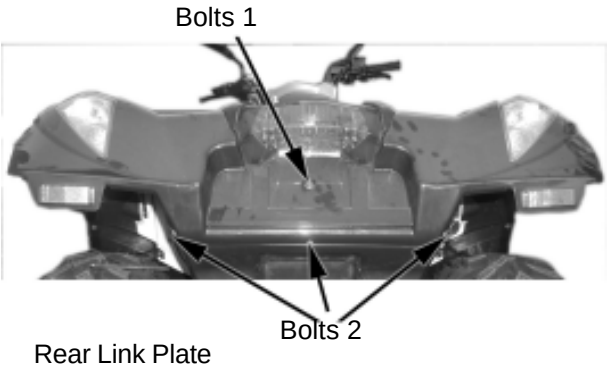
--Bolt 1,2,1

--Rear Protector

Installation:

Reverse the remove procedure and direction for installation.





Rear Link Plate

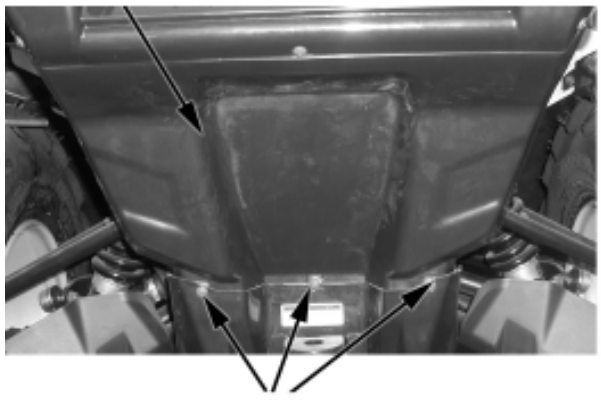
Remove:

--Bolt 3

Rear Link Plate

Installation:

Reverse the remove procedure and direction for installation.

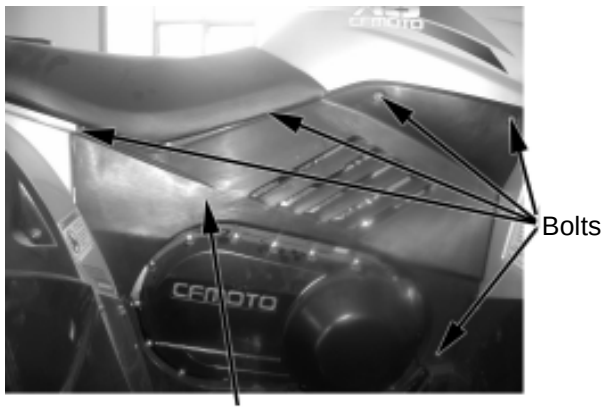


Rear Side Panel

Remove:

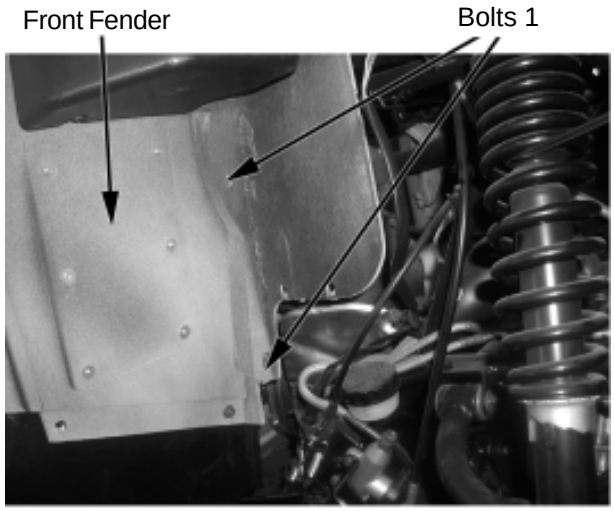
--Seat（→2-3）

--Right Side Cover Fixing Bolt



Remove connecting Bolt 1 between Right Side Panel and Front Fender at bottom of Front Fender;

Remove Right Side Panel.



Installation:

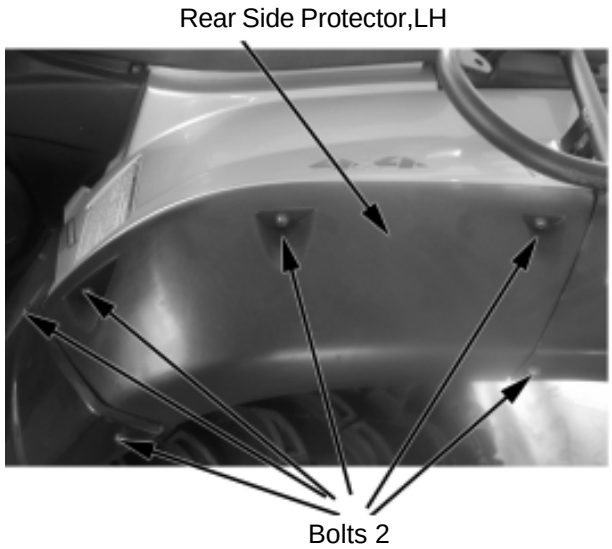
Reverse the remove procedure and direction for installation .

Rear Right Side Support

Remove

--Bolt 2

--Remove Rear Right Side Support



Installation:

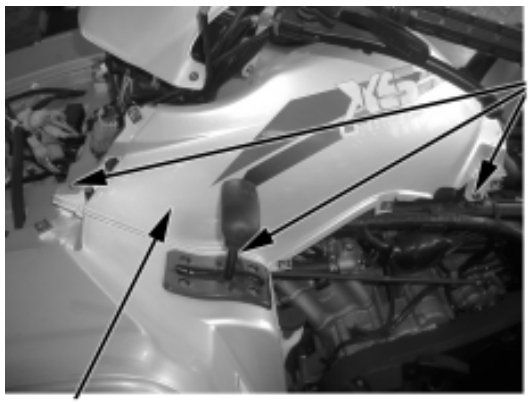
Reverse the remove procedure for installation.

Removal and Installation and Rear Right Side Support is same with Left side.

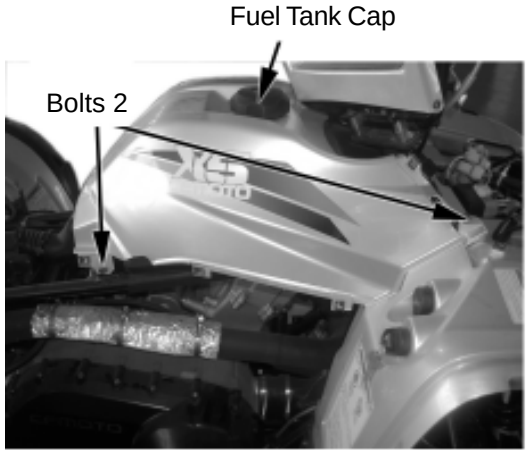
Top Cover, Fuel Tank

Remove:

--Seat（→2-3）
--Front Rack（→2-2）
--Front Top Cover（→2-4）
--Left Side Panel（→2-7）
--Right Side Panel（→2-8）
--Bolt 1, 2



--Bolt 3, 4
--Fuel Tank Cap



Remove Fuel Tank Top Cover.

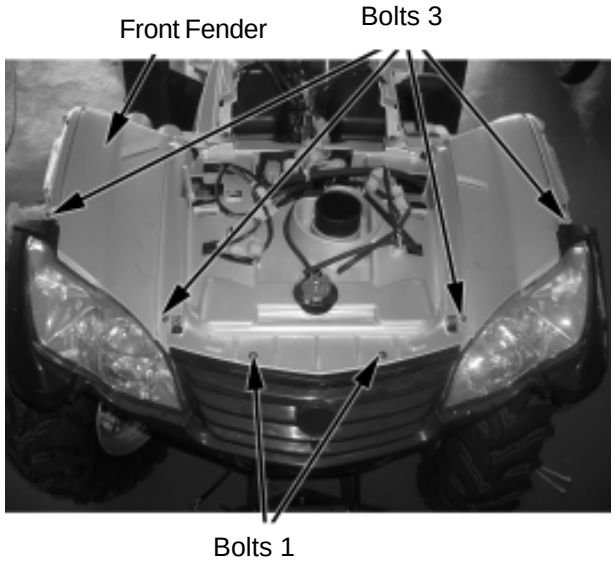
Installation:

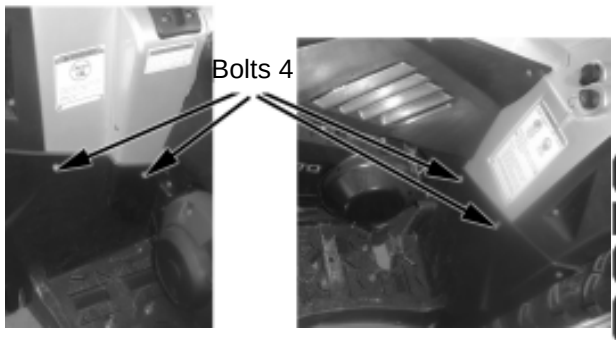
Reverse the remove procedure and direction for installation .

Front Fender

Remove

--Front Rack（→2-2）
--Front Top Cover（→2-4）
--Left, Right Side Panel（→2-7）（→2-8）
--Fuel Tank Top Cover（→2-8）
--Left,Right Side Support（→2-5）
Loosen Cable Connector of Front Fender;
Remove Electronics Parts of Front Fender;
Remove 3 Front Fender bolts fixed in Frame.





Remove 4 bolts fixed with left and right footrest;
Remove Front Fender.

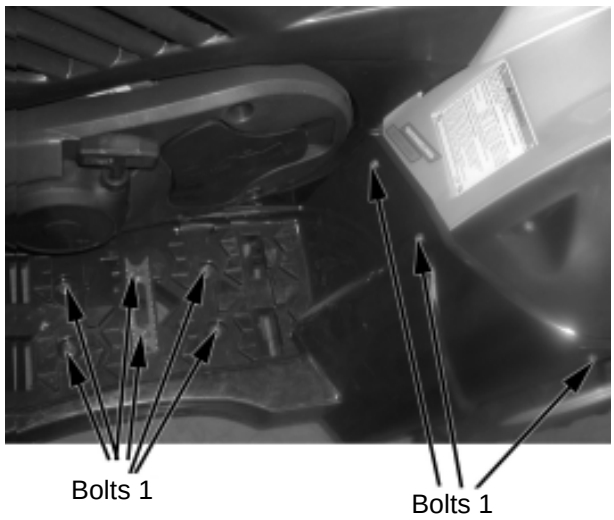
Installation:

Reverse the remove procedure for installation.

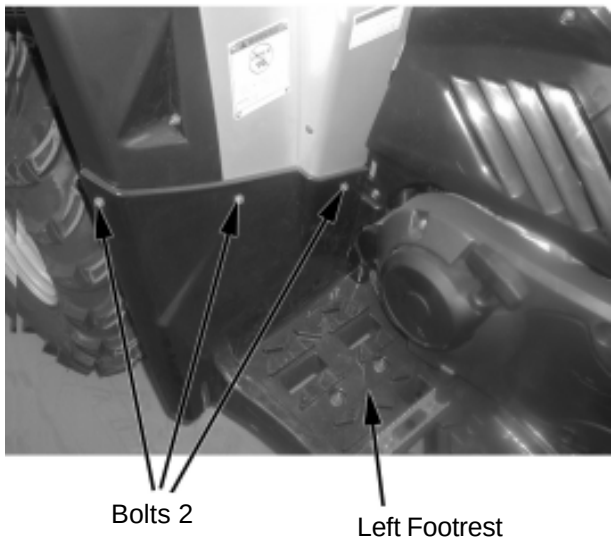
Footrest,Left Side

Remove:

Left Side Panel (→ 2-7) ;
Remove three Bolt 1 and 3 nuts connecting with Front Fender.



Remove three Bolt 2 and 3 nuts connecting with Rear Fender.



Remove Bolt 1;
Remove Left Footrest.

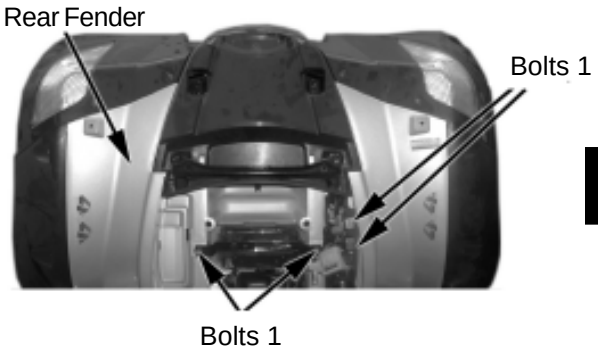
Installation:

Reverse the remove procedure for Installation.

Footrest,Right Side

Removal and Installation same with Left side.

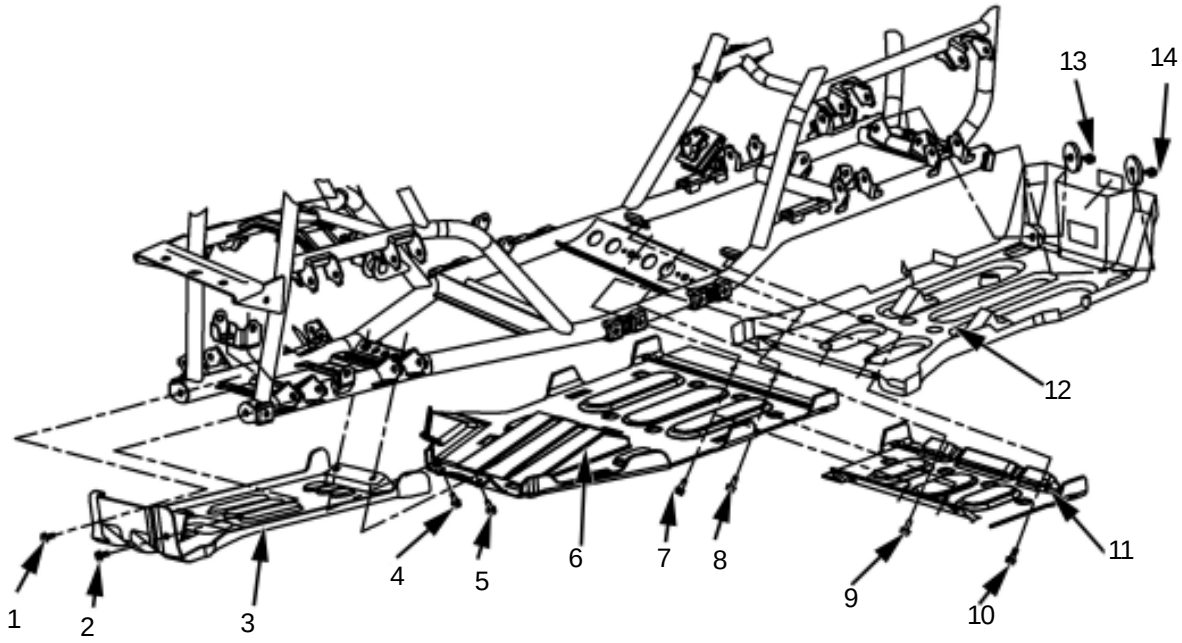
Rear Fender



Remove:

--Seat（→2-3）
--Rear Rack（→2-3）
--Rear Top Cover（→2-6）
--Left,Right Side Panel（→2-7）（→2-8）
--Lef,RightSide Support（→2-8）
--Rear Protector（→2-7）
Remove Battery Bracket and Fixing Plate（→8-4).
Remove Battery（→8-4);
Remove Bolt 1;
Remove Nut 1;
Remove Electonic Parts from Rear Fender;
Loosen Cable Connector from Rear Fender;
Upwardingly Remove Rear Fender.

Engine Front,Middle and Rear Skid Plate; Protector Plate of Double



1.Bolt1	6.Middle Engine Skid Plate	11.Protection Plate
2.Bolt2	7.Bolt5	12.Rear Engine Skid Plate
3.Front Engine Skid Plate	8.Bolt6	13.Bolt9
4.Bolt3	9.Bolt7	13.Bolt9
5.Bolt4	10.Bolt8	14.Bolt10

Disasembly

NOTE: Side skid Plate(Front,Middle, Rear) and Double Seat Protection are located at bottom of vehicle. The mainteanace person should work under bottom of vehicle when disassemble the above parts.
For safty , make sure the vehicle is firmly parked.

Engine Skid Plate(Front)

Remove Bolt 1, 2, 3,and 4;
Remove Engine Front Skid Plate.

Installation:

Reverse the remove procedure for Installation.

Engine Skid Plate(Middle)

Remove Bolt 5 and 6;
Remove Middle Engine Skid Plate.

Installation:

Reverse the remove procedure for Installation

Double-Seat Protection Plate

Remove Bolt 7 and 8;
Remove Double-Seat Protection Plate.

NOTE: No Protection Plate for single-seat .

Installation:

Reverse the remove procedure for Installation

Engine Skid Plate(Rear)

Removal:

Remove Bolt 9 and 10;
Remove Rear Engine Skid Plate.

Installation:

Reverse the remove procedure for Installation

Right Front Inner Fender

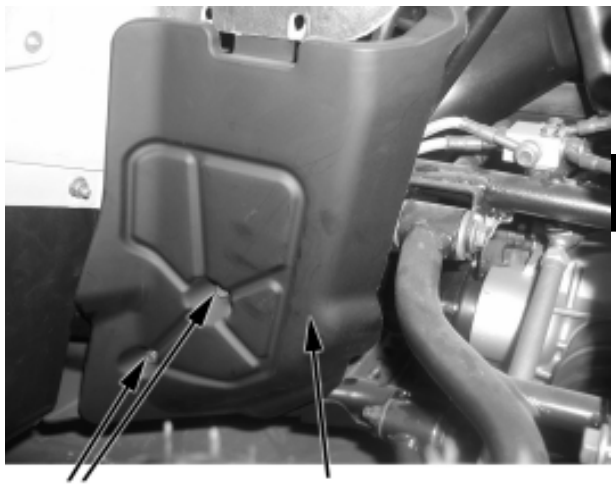
Removal:

Remove Bolt 1 ,and remove Right Front Inner Fender.

Installation:

Reverse the remove procedure for Installation.

NOTE: Hook Water Pump with Clip of Right Inner Side Fender during Installation.



Bolt 1 Right Front Inner Fender

Left Front Inner Fender

Removal:

Remove Bolt 1 ,and remove Left Front Inner Fender.

Installation:

Reverse the remove procedure for Installation.

Front Left Protector

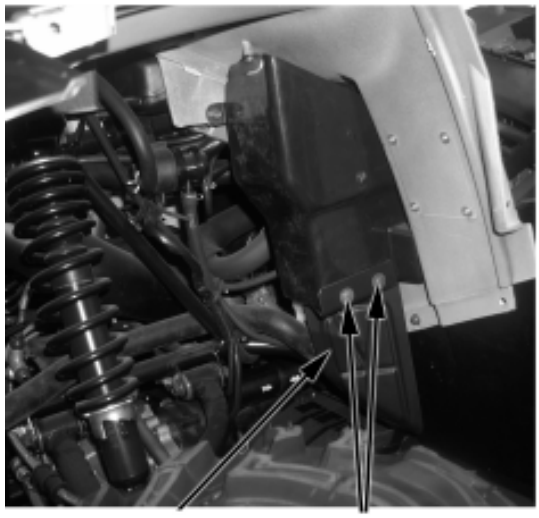
Remove:

--Bolt 1

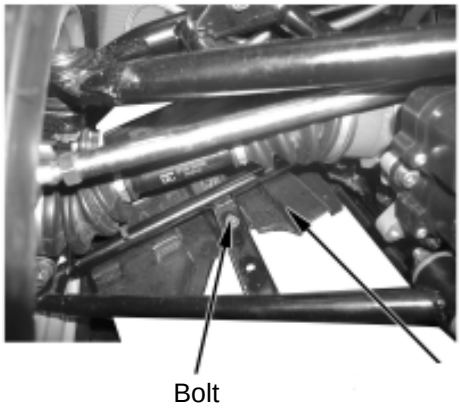
Pull backward and remove front Front Left Protector.

Installation:

Reverse the remove procedure for Installation.



Front Inner Fender,LH Bolts 2



Bolt

Front Right Protector

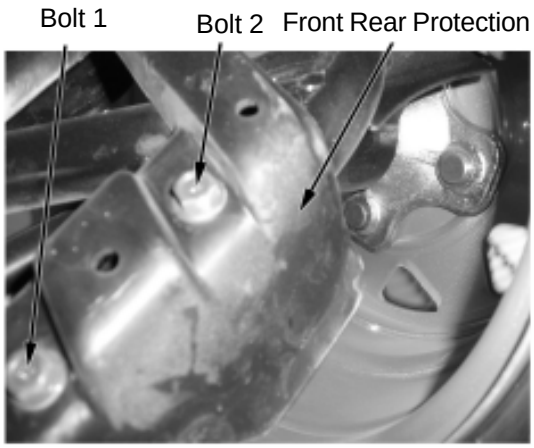
Removal and Installation same with Left Side.

Front Left Inner Fender

Removal:

Remove Bolt 1 and 2;

Remove Front Left Inner Fender

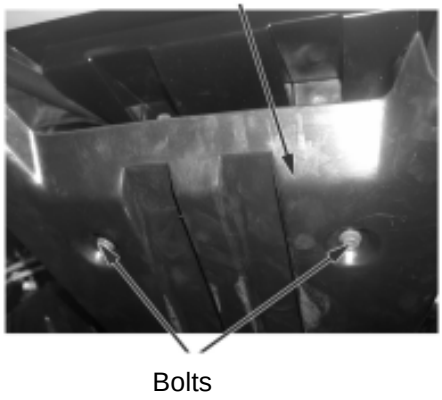


Installation:

Reverse the remove procedure for Installation

Front Right Inner Fender

Removal and Installation same as Left Side.



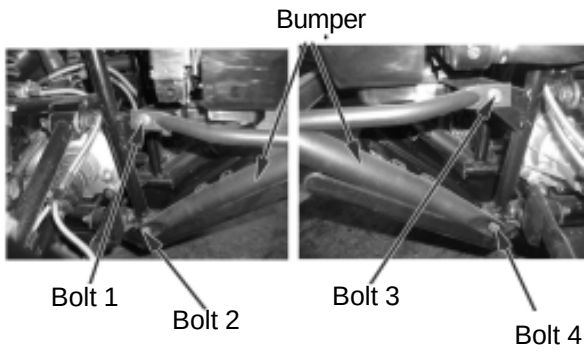
Bumper, Bumper Protector

Remove:

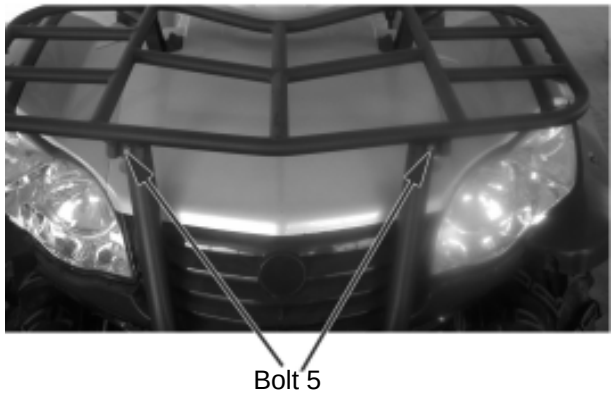
Remove two Bolts of Engine Front Skid Plate fixing into the Bumper.

Remove Bolt 1, 2, 3 and 4.

Remove Bumper and Bumper Protector



Remove Bolt 5 connecting Bumper and Rack.



Bumper Protector

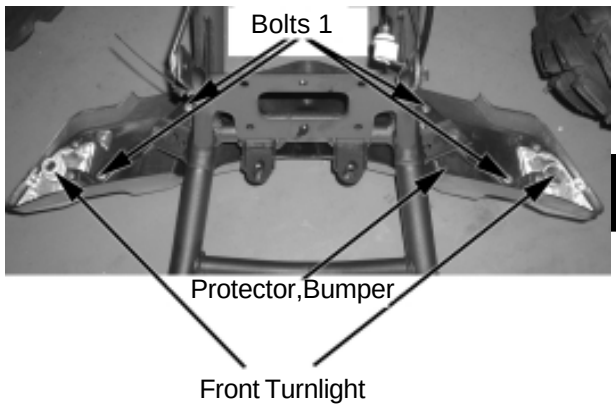
Remove:

--Loosen Front Turning Light Connector.

--Remove Bumper and Bumper Protector.

Remove tapping screw 1 from Bumper;

Remove Bumper Protector.



Installation:

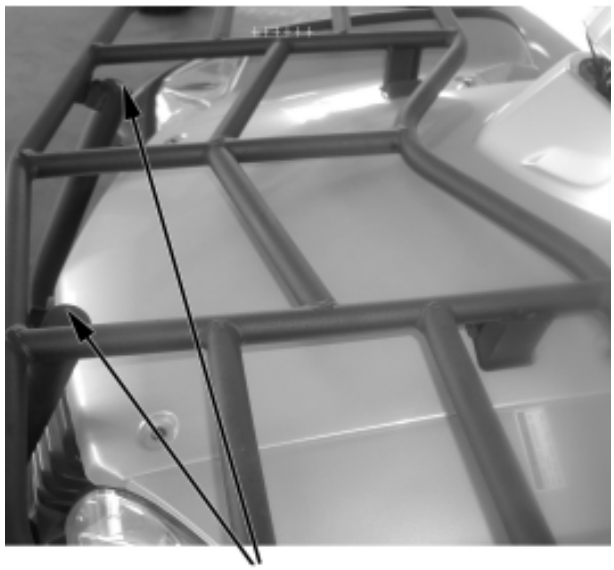
Reverse the remove procedure for Installation.

Bumper Protector Cap

Remove:

Pull the two Caps from Bumper .

(There are only 2 caps in this vehicle.)



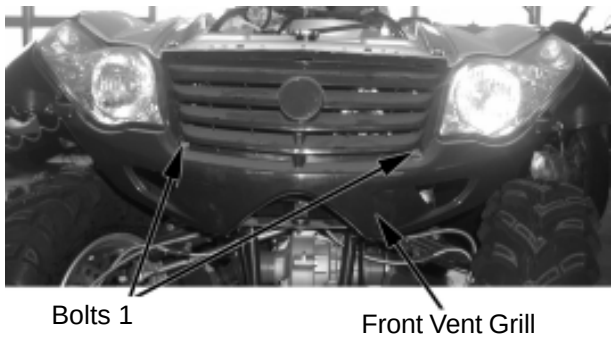
Installation:

Press Caps into Bumper Pipe.

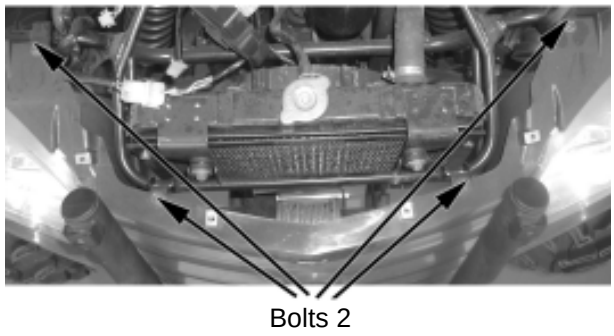
Front Vent Grill

Remove:

--Loosen Connector of Front Head Light
--Remove Front Fender（→2-9）
--Remove Bumper（→2-14）
--Remove Bolt 1, 2 and 3
--Remove Vent Grill

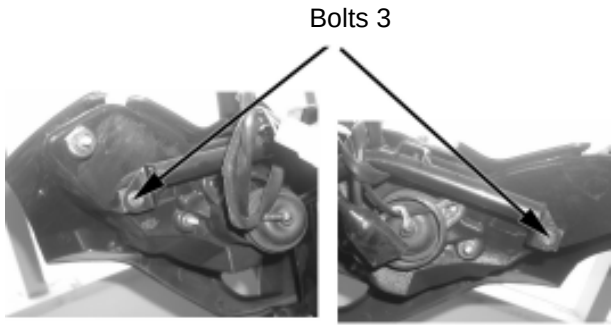


NOTE: For removal of front vent grille only,
Just remove 2 fixing bolts
of bumper and 2 center fixing bolts,
then pull bumper down.



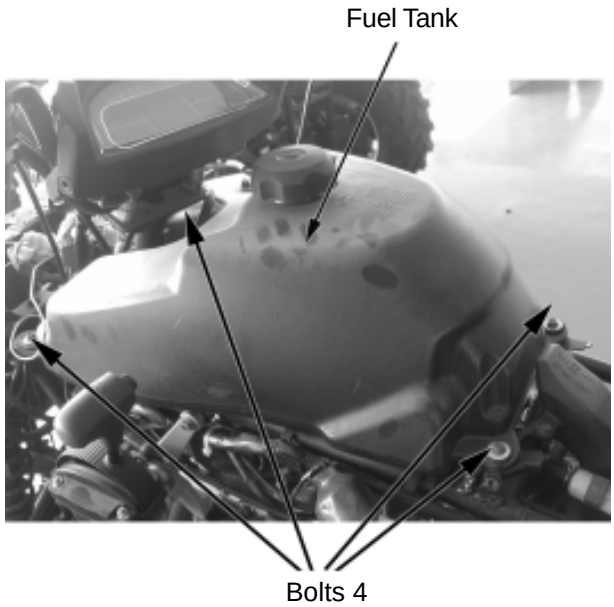
Installation:

Reverse the removal procedure for installation.



WARNING: Gasoline is highly flammable, therefore smoke and fire are strictly forbidden in the work place.
Special attention should also be paid to sparks.
Gasoline may also be explosive when it is vaporized, so operation should be done in a well-ventilated place.

Remove Left and Right Side Panel（→2-7）;
Remove Front Fender（→2-9）;
Remove Fuel Tank Top Cover（→2-9）;
Remove Bolt 4;
Loosen Fuel Sensor 3P Connector.



Remove Fuel Line 1 and Circlip;
Remove Fuel Tank.

Installation:

Reverse the removal procedure for installation.

NOTE:

Be careful not to damage main cable, pipes and hoses. Main cable, cables, pipes and hoses should be routed properly according to the routing drawing.
Take precaution against fuel leakage when removing fuel Fuel Hose I.

Remove:

--Fuel tank (→ 2-16)
--Bolt 1
--Bolt 2
--Fuel tank top cover

Installation:

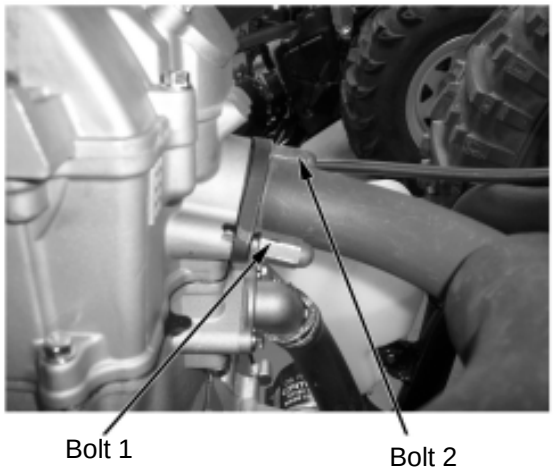
Reverse the removal procedure for installation.

NOTE:

Be careful not to damage main cable, pipes and hoses. Main cable, cables, pipes should be routed properly according to the routing drawing.

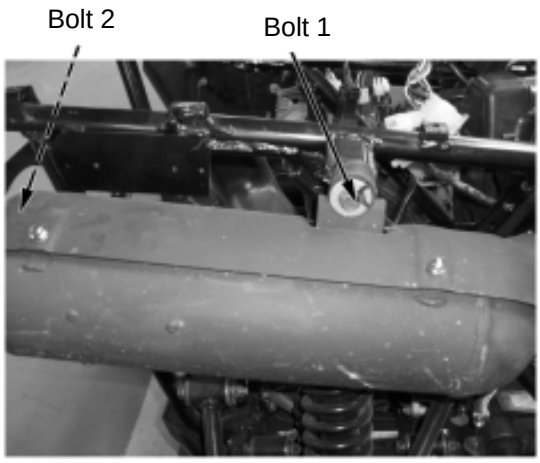
Muffler

Caution: Perform disassembly only after the muffler is cooled down.



Remove:

--Seat (2-3)
--Right side panel (2-8)
--Nut1, Nut 2 for exhaust pipe elbow

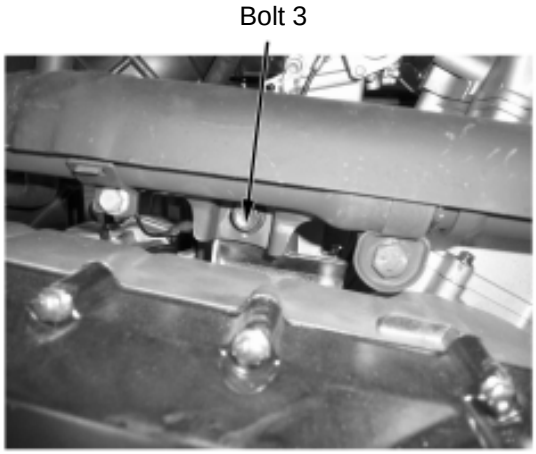


Remove Bolt ;

Remove Bolt 2, Bolt 3
Remove muffler .

Installation:

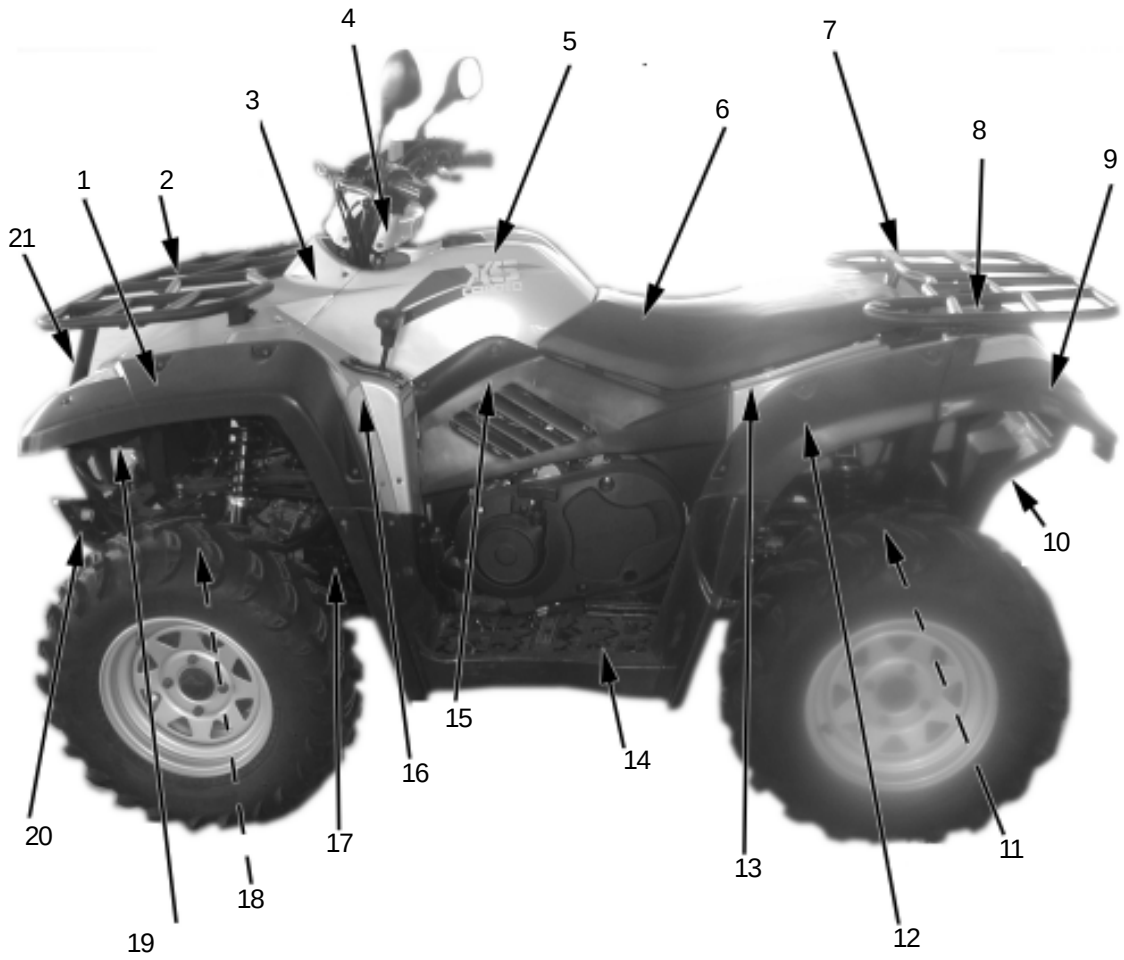
Reverse the removal procedure for installation.



NOTE:

Replace sealing gasket when installing the muffler.

Visible Parts:



1.Front Suspension Protector,LH 2.Front Rack 3.Front Top Cover 4.Dashboard Cover 5.Top Cover,Fuel Tank 6.Seat 7.Rear Rack 8.Rear Top Cover 9.Rear Protector 10.Rear Link Plate 11.Rear Suspension Protector,LH 12.Rear Side Protector 13.Rear Fender 14.Left Footrest 15.Left Side Panel 16.Front Fender 17.Front Inner Fender 18.Front Protector 19.Front Vent Grill 20.Bumper Protector 21.Front Bumper

Overhaul Info

Operation Cautions

NOTE:

-DO NOT keep the engine running for long time in a poorly ventilated or enclosed place because of the harmful components like CO, etc, in the exhaust gas.

-The muffler and engine are still very hot when the engine is just stopped. Careless contact may cause serious burn. Be sure to wear fatigue dress with long sleeves and gloves if the work has to be done after the engine is just stopped.

-Gasoline is highly flammable, smoking is strictly forbidden in the work place. Keep alert on the electrical sparks. Besides, vaporized gasoline is highly explosive, so work should be done in a well-ventilated place.

-Be careful that your hands or clothes not get pinched by the turning or movable parts of the driving system.

NOTE:

The vehicle should be parked on hard and level ground.

Maintenance Interval

The table below lists the recommended intervals for all the required periodic maintenance work necessary to keep the engine at its best performance and economy. Maintenance intervals are expressed in terms of kilometer, miles and hours, whichever occurs first.

Note: Maintenance interval should be shortened on engines that are used in severe conditions.

Interval / Item		Initial	Every	Every	Remark
	Km	250km/155miles	500km/300miles	1000 km/600miles	
	Hours	Initial 20 hours	Every 50 hours	Every 100 hours	
Valve Clearance		I	—	I	IN: .002 ~.004in. EX: .006~.009in.
Idle Speed		I	I	—	1400±100r/Min
Spark Plug		I	—	I	No carbon deposit Gap:.030~.040in.
		Replace every 6000Km			
Air Filter		—	I	C	Replace every 1200miles
High-Pressure Fuel Hose		—	—	I	Replace every 4 years
Clutch		—	—	I	
Drive Belt		—	I	—	Replace every 1200miles
Engine Oil		R	—	R	
Oil Filter		R	—	R	
Coolant Level		I	I	—	
Water Hose & Pipes		I	—	I	
Coolant		Replace every year			

I=Inspection and adjust, or replace if necessary
R=Replace
C=Clean

Inspection & Maintenance **○: Interval**

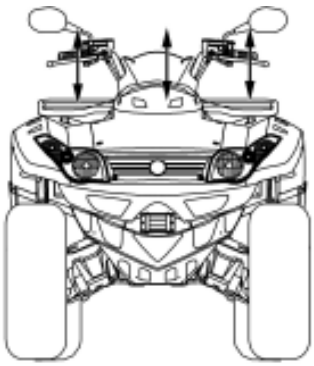
Item			Intervals			Standard
Part		Item	Daily	1/2 Year	Annual	
Steering System	Handlebar	Operation agility	○			
	Steering system	Damage	○			
		Installation condition of steering system	○			
		Sway of ball stud	○			
Brake System	Brake lever	Free play	○	○		Front: lever end 0mm Rear : lever end 0mm
		Brake Efficiency	○	○		
	Connecting rod, oil pipe & Hose	Looseness, Slack and damage	○		○	
	Hydraulic brake and brake disc	Front and rear brake fluid level	○	○		Brake fluid should be above LOWER limit
		Brake disc damage and wear	○	○		Replace when the thickness of front brake disc is less than 2.5mm, rear brake less than 6.5mm.
Driving System	Wheel	Tire pressure	○	○		Front tire: 35kPa /5Psi Rear tire: 30kPa /4Psi
		Chap and damage	○		○	
		Groove depth and abnormal wear	○		○	No wear indication on the surface of tire (the remained depth of groove should not be less than 1.6mm)
		Loosened wheel nut and axle	○	○		
		Sway of front wheel bearing	○		○	
		Sway of rear wheel bearing	○		○	
Buffer System	Suspension arm	Sway of Joint parts, rocker arm damage	○		○	
	Shock absorber	Oil leakage and damage	○		○	
		Function			○	
Drive Train	Front axle	Transmission, lubrication	○		○	
	Rear axle	Transmission, lubrication	○		○	
	Gear box	Transmission, lubrication	○		○	Remove filling bolt, add oil till oil level reaches edge of filling hole.
	Final shaft (Drive shaft)	Looseness of joint parts				
		Sway of Spline				

Item			Intervals			Standard
Part		Item	Daily	1/2 Year	Annual	
Drive train	Final shaft (Drive shaft)	Looseness of joint parts	O	O		
		Sway of Spline			O	'
Electrical System	Ignition Device	Spark plug		O		Spark plug gap: 0.8-0.9mm/.030~.040in.
		Ignition timing		O		
	Battery	Terminal Joint			O	
	Wiring	Looseness and damage of joints			O	
Fuel device		Fuel leakage		O		
		Throttle			O	Throttle grip clearance: 3~5mm
Cooling system		Coolant level	O	O		
		Coolant leakage			O	

Item		Intervals			Standard
Part	Item	Daily	1/2 Year	Annual	
Lighting device and turning indictors	Function	○	○		
Alarm and lock device	Function			○	
Instruments	Function			○	
Exhaust pipe and muffler	Looseness or damage caused by improper installation			○	
	Function of muffler			○	
Frame	Looseness and/or damage			○	
Others	Lubrication & grease of frame parts			○	
Abnormal parts which can be determined when driving	Make sure if there is any abnormal with relative parts.	○			

Steering Column

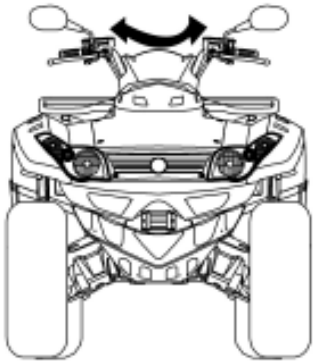
Park the vehicle on level place, hold steering handlebar, and shake in the direction as illustrated on the right and see if there is any sway.



In case of any movement, check if it is the problem of the steering stem or other parts and then do the maintenance accordingly.

In case of movement of the steering stem, tighten the locknut or disassemble the steering stem for further check.

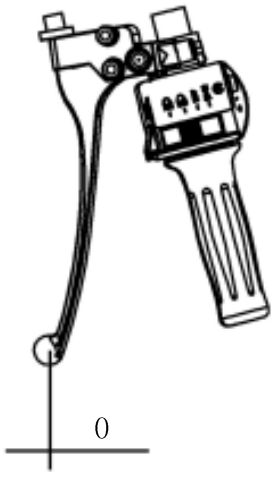
Park the vehicle on level place, slowly turn the handlebar left and right to see if it can turn freely.



In case there is any hindrance, check if it is from the main cable assembly or other cables.

If no, check the steering tie-rod end, and check if the steering stem bearing is damaged.

NOTE:
Make sure the steering can be operated freely.
An accident may occur
if the handlebar is out of control.



Brake system

Front brake lever free play

Operate front brake lever and check brake efficiency and brake lever function.
Check free play of front lever end.

Free play: 0 mm

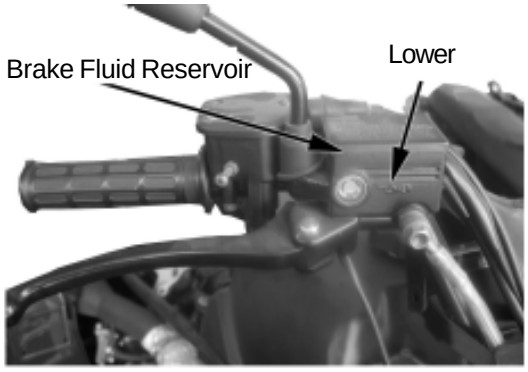
Master Cylinder

<Fluid level>

Check the Brake Fluid Level

When the brake fluid level is near to the lower limit line, check master cylinder, brake hoses and joints for leakage. Remove the two mounting screws on fluid reservoir cap.

Remove the cap, add DOT3 or DOT4 brake liquid till the upper limit line.



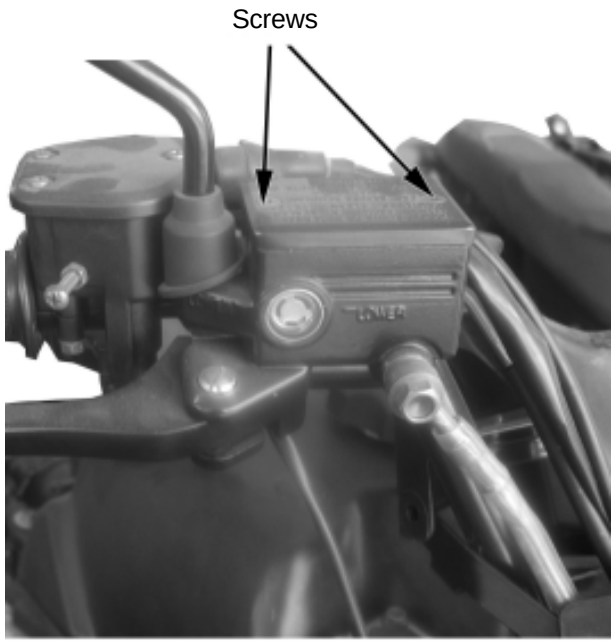
-Do not mix with dust or water when adding brake fluid.

-Use only the recommended of brake fluid to avoid chemical reaction.

-Brake fluid may cause damages to the surface of the plastic and rubber parts.

Keep the fluid away from these parts.

-Slightly turn the handlebar left and right till the master cylinder is in horizontal, then remove the fluid reservoir cap.



Brake Disc, Brake Pad

< Wear of brake pad>

Check the brake pad wears from the mark as indicated. Replace the brake pad if the wear has reached position of wear limit trough.

Note The brake pad must be replaced with a whole set.

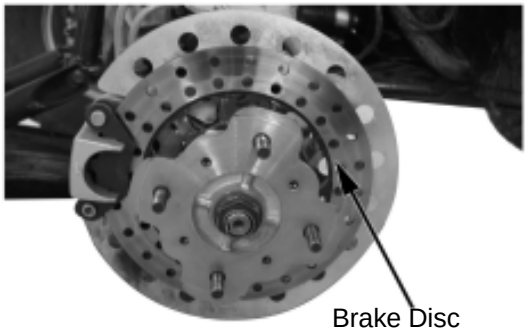
Checking and replacing the brake disc

Front brake disc thickness: ≤2.5 mm ¡úReplace

Rear brake disc: ≤6.5 mm →Replace

Min. limited thickness of the front brake disc: 2.5mm

Min. limited thickness of the rear brake disc: 6.5mm



Change the Brake Fluid

< Changing Brake Fluid>

Change the brake fluid once every year.

Wheels

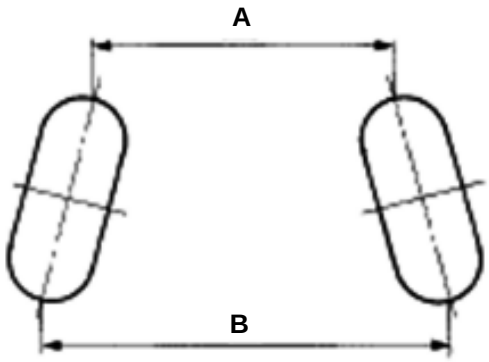
Lift front wheel on level place, and make sure there is no loading on the wheels.

Shake the front wheel left and right to check whether the joint of front wheel is tightened and check whether it sways.

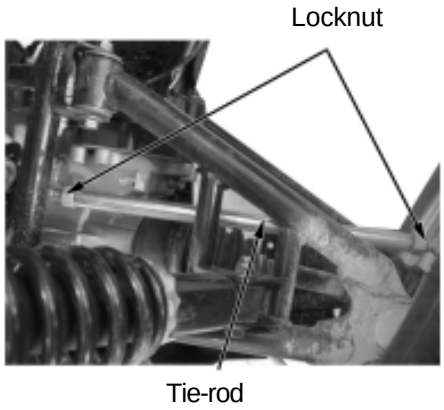
Not tighten enough: →Tighten it
Sway: →Replace the rocker arm

Front Toe-in size

Park the vehicle on level place, measure the front toe-in
Toe-in: B-A=0-10mm/0-3/8in.



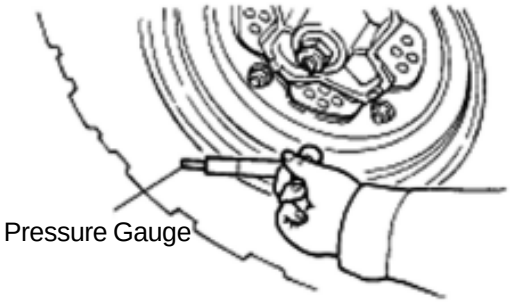
Toe-in out of the range: → Adjust the locknut of tie-rod



NOTE:
After the toe-in has been adjusted, slowly run the vehicle to check whether the direction of vehicle can be controlled by handlebar.

Tire Pressure

Check the pressure of the tires
with a pressure gauge.



NOTE:
Check the tire pressure after tires are cooled.
Driving under improper tire pressure
will reduce the comfort of operation
and riding, and may cause abnormal
wear of the tires.

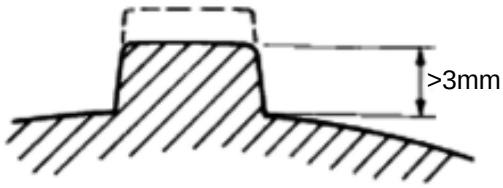
Specified pressure /tire

	Front wheel	Rear wheel
Pressure	35kPa/5Psi	30kPa/4Psi
Tire Size	AT25 × 8 — 12	AT25 × 10 — 12

Tire Tread

Check the tire tread.

Tread Height: < 3mm¡úReplace with new tires



NOTE:
When the tread height is less than 3mm, the tire should
be replaced immediately.

Wheel Nut and Wheel Axle

Check front and rear wheel axle nuts for looseness;
Loosened axle nuts：→Tighten
Tightening Torque:
Front wheel axle nut:
110-130**N.m**(11.2kgf.m-13.3kgf.m)
Rear wheel axle nut:
110-130**N.m**(11.2kgf.m-13.3kgf.m)

Movement of Wheel Bearing

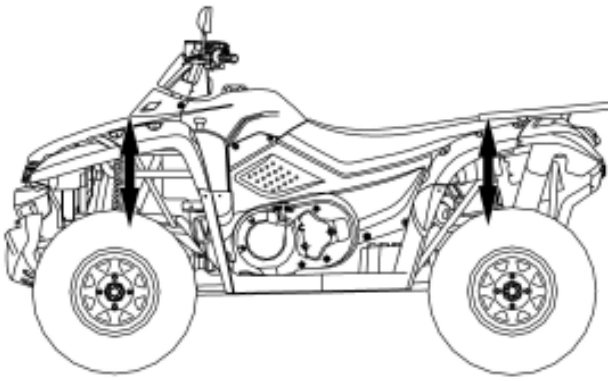
Lift the front wheel ;
Make sure there is no loading on the vehicle;
Shake the wheel in axial direction for any movement;

In case of any movement,
disassemble the front wheel and check the bearing.

Suspension System

Park the vehicle on lever place, press the vehicle Several times up and down as illustrated on the right.

In case of any rocking or abnormal noise, check whether there is any oil leakage from shock absorbers, or any damage or looseness of suspension parts.



Adjusting the Shock Absorber

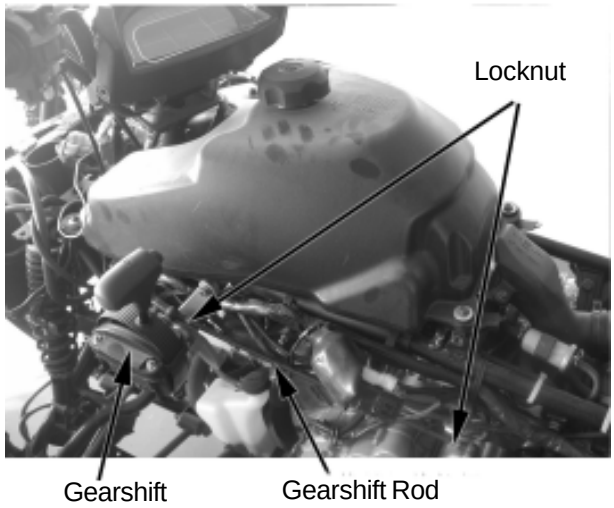
Use special tools to adjust the length of shock absorber spring according to loading requirement;
Turn clockwise to adjust from high to low to change spring preload of shocks.

Gear Shifting

Shift the gear to check for flexibility and gear engagement;

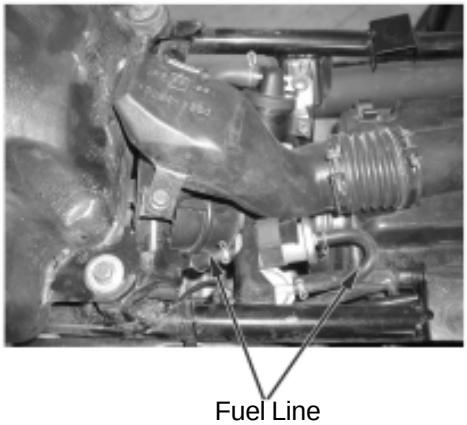
Adjust the gearshift rod if necessary;

Release the locknut to adjust the length of gearshift rod.

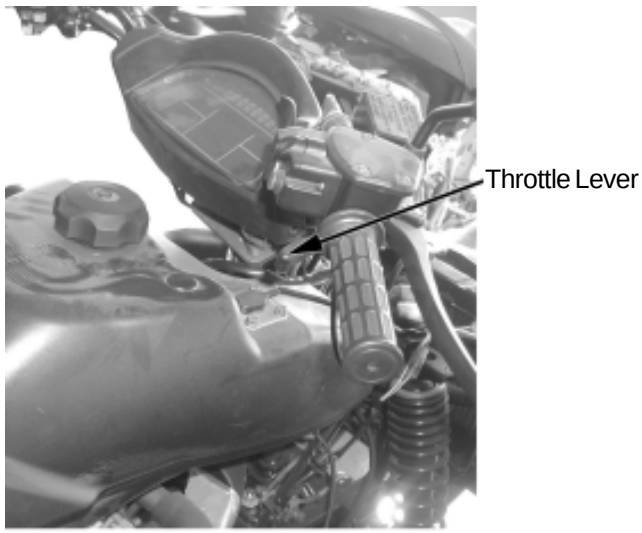


Fuel Device

Status of the fuel system;
Remove the seat (→2-3);
Check the fuel line for any aging or damage;
Aged or damaged fuel line:→ Replace;
Check if there is cracks or bending with the vacuum tube;
Cracked or bended vacuum tube: → Replace.



Checking the Throttle Lever



Check the free play of throttle lever

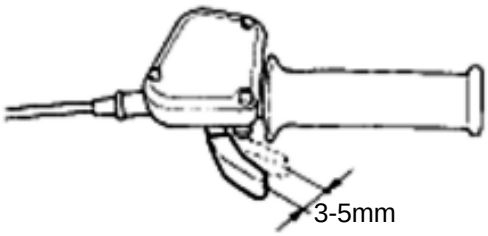
Free play: 3-5mm

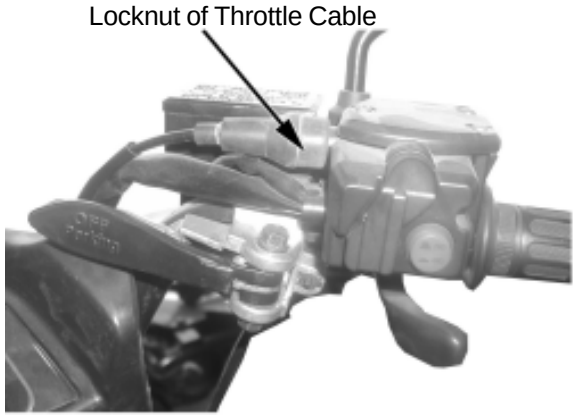
Out of range: →Adjust

Loosen locknut of throttle cable
turn the adjustor and adjust free play of throttle lever

After adjusting, tighten locknuts and install throttle cable sleeve

Replace with a new throttle cable if the specified free play could not be acquired by adjustment or if there is still stickiness with the throttle.



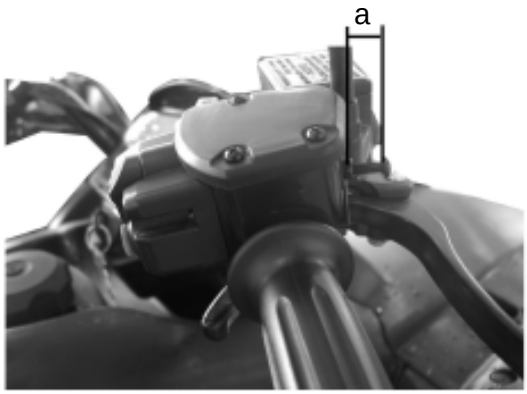


Adjusting the Speed Limiter

The speed limiter is to limit the opening of throttle
Check the maximum length of limiter screw thread
Maximum screw thread: a=12mm
Adjust with a screw driver.

NOTE:
For beginners, the speed limit should be fully tightened.
Drivers with certain skills may adjust the throttle with speed limiter

Maximum length of screw thread is 12mm.
It is recommended to adjust the thread length to 3-5mm.



Cooling System

NOTE:

Check coolant level from reservoir tank.

Do not check from radiator.

If the radiator cap is opened while the engine is hot (over 100℃), the pressure of the cooling system will drop down and the coolant will get boiled rapidly.

DO NOT open the radiator cap until the coolant temperature drops down.

-Coolant is poisonous, DO NOT drink or splash it to skin, eyes, and clothes.

-In case the coolant gets to the skin and clothes, wash with soap immediately.

-In case the coolant gets into eyes, rinse with plenty of water and go to consult the doctor

-In case of swallowing the coolant, induce vomit and consult the doctor.

-Keep the coolant in a safe place and away from reach of children.

Coolant level

Coolant might reduce due to natural evaporation.

Check the coolant level regularly.

NOTE:

-Only use anti-freeze. Ordinary water may cause engine rust or cracks in winter due to freezing.

-Park the vehicle on level ground for checking of the coolant.

Inclined vehicle body will cause incorrect judging of the coolant level.

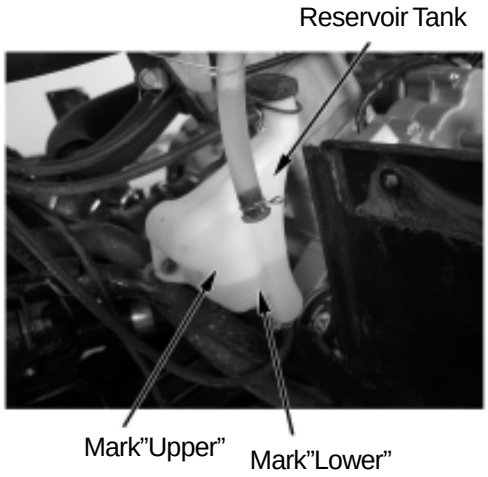
-Check the coolant after the engine is warmed up.

Start and warm up engine.

Stop the engine.

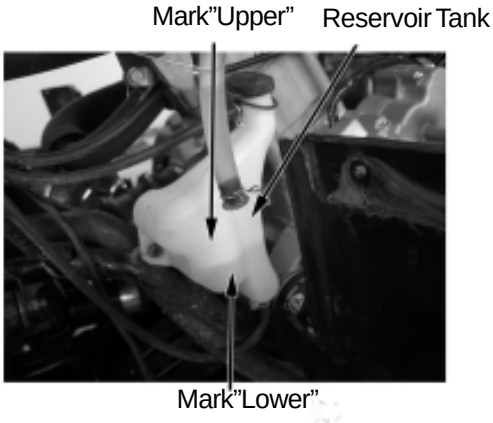
Remove left side panel（→2–6）

Check if the coolant level is between the upper and lower limit.



When the coolant level is below the LOWER limit, remove reservoir tank cap and add coolant till upper limit.
(Add coolant or diluted original liquid).
Recommended coolant: CFMOTO coolant

Standard density: 50%
(Freezing temperature of coolant varies according to the different mixture ratio. Adjust the mixture ratio according to the lowest temperature in the place where the vehicle is used.)
If the coolant reduces very fast, check if there is any leakage.
The cooling system may be mixed with air when there is no coolant in the reservoir tank and the air should be bled before adding coolant.



Coolant Leakage
Check radiator hose, water pump, water pipes and joints for leakage.
In case of any leakage, disassemble and do further check.
(Refer to Chapter 4)

Check the radiator hose for aging, damages or cracks.

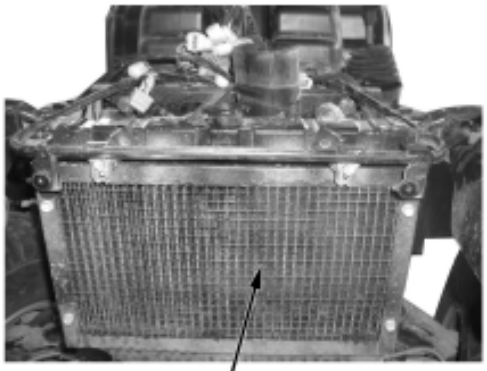
The rubber hose will naturally get aged after a period of service time. The aged hose may get cracked when the cooling system is heated. Nip the hose with fingers and check if there are any tiny cracks.

In case of any abnormal, replace with a new hose.

Check the clamps of the coolant pipes and hose. Tighten properly in case of any looseness.

Check radiator fins for mud and dust clog or damage.

Correct the bent fins; clean the mud with water and compressed air. When the damaged area of the radiator fin is over 20%, replace with a new radiator.



Inspection of Cooling System

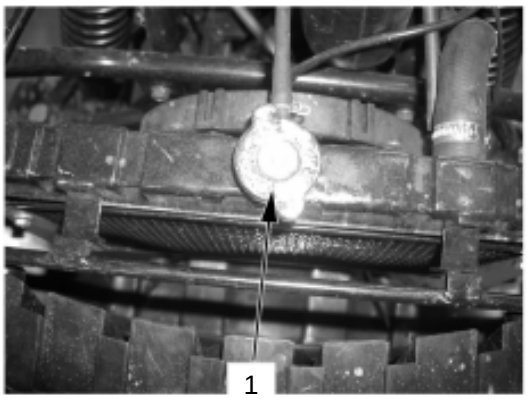
Check initially at 50 hours or 500km, replace coolant annually.

Check radiator, reservoir tank and water hoses.

Leakage or Damage: → Replace

Check coolant level by observing the upper and the lower limit on the reservoir tank.

If the level is below lower limit, fill coolant until the level reaches the upper limit.

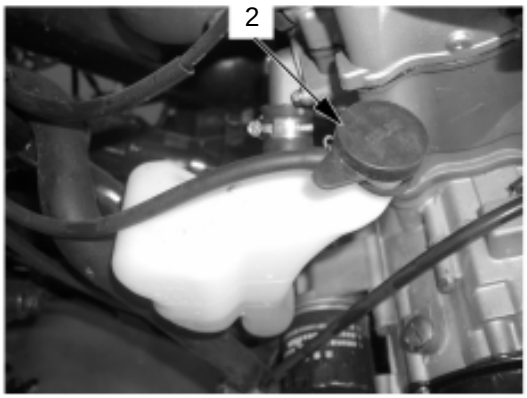


Replacing Coolant

-Remove radiator cap 1 and reservoir tank cap2.

-Place a pan below water pump, and drain coolant by removing drain plug 3 and water hose4.

-Drain coolant from reservoir tank.



WARNING:

-Do not open radiator cap when engine is hot, you may be injured by escaping hot liquid or vapor.

-Engine coolant is harmful. If coolant splashes in your eyes or clothes, thoroughly wash it away with water and consult a doctor. If coolant is swallowed, induce vomiting and get immediate medical attention.

-Keep coolant away from reach of children

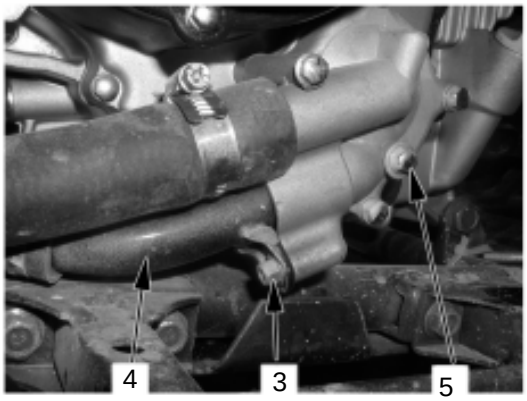
-Clean radiator with fresh water, if necessary.

-Connect water hose 4 and tighten drain bolt 3 securely.

-Fill the specified coolant into the radiator.

-Loosen bleed bolt 5 on water pump, when coolant flow from bleed bolt, tighten the bolt. Install radiator cap 1securely after filling coolant.

-Start the engine and keep it running for several minutes. After warm up and cooling down the engine, open radiator cap and check coolant. Fill the specified coolant until the level is between the upper and lower lines on the reservoir tank.



CAUTION:

Repeat the above procedures several times and make sure the radiator is filled with coolant and air is discharged.

Inspection of Cooling System

Check Water Temperature Gauge

When engine is not working, the water temperature should be in the “0” position. Start the engine to check if the indicator works. If the indicator is not working, do the maintenance in time.

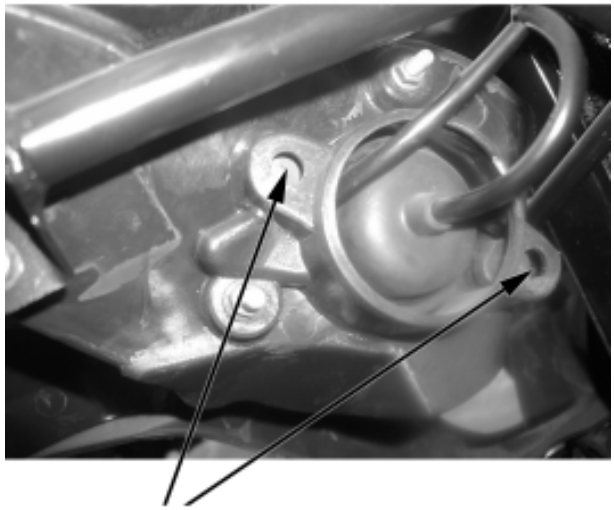
Instrument

Water Temp Gauge

Lighting System

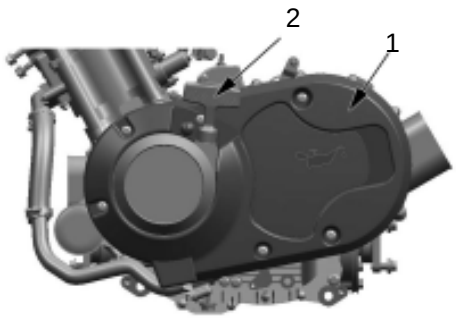
Adjusting headlight light beam

Turn the headlight beam adjusting screw with a cross screwdriver and adjust the high/low beam to meet the requirement.



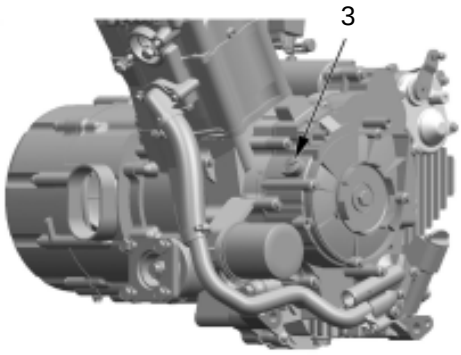
Headlight Beam Adjusting Screw

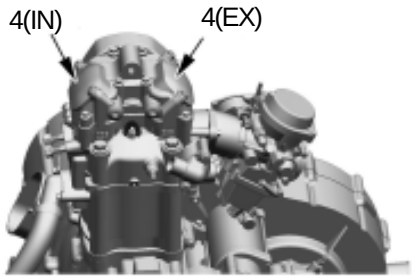
VALVE CLEARANCE



Inspect initially at 20-hour break-in and every 100 hours or every 1000km thereafter. Inspect the clearance after removing cylinder head.

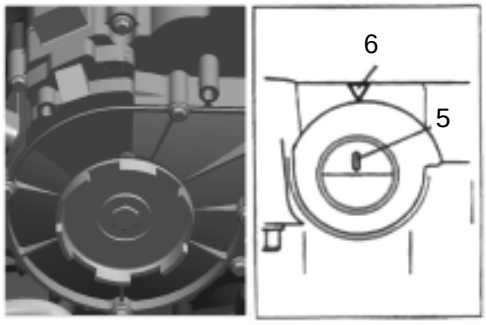
Excessive valve clearance results in valve noise and insufficient valve clearance results in valve damage and reduced power.
Check the valve clearance at the period indicated above and adjust the valve clearance to specification, if necessary.
-Remove cover plate 1, recoil starter 2
-Remove inspection cap 3 on left crankcase.
-Remove 2 valve adjusting cover 4
-Turn the crankshaft until the line 5 of T.D.C. on rotor is aligned with mark 6 of inspection hole on left crankcase.
-Insert feeler gauge to check the clearance between the valve stem end and the adjust bolt on the rocker arm.
Valve Clearance (When cold)
IN: 0.05-0.10mm/.002-.004in.
EX: 0.17-0.22mm/.006-.009in.





NOTE:
-The valve clearance must be adjusted when the engine is cold.
-Adjust the valve clearance when the piston is at the Top Dead Center (T.D.C.) on the compression stroke.

If the clearance is incorrect, bring it into the specified range using the special tool.



Loosen valve adjust bolt and nut, insert a feeler gauge (IN: 0.1mm, EX:0.2mm) between the valve stem end and valve adjusting bolt, tighten valve adjust bolt, make sure it slightly contacts the feeler gauge, tighten bolt and nut.

Take out the feeler gauge, measure the clearance.
If the clearance is incorrect, repeat the above steps until the proper clearance is obtained.
Locknut: 10 **N.m**

CAUTION:

Securely tighten the locknut after completing adjustment
Install:
2 valve adjusting cover;
Inspection cap;
Recoil starter;
Cover plate;
Apply a small quantity of THREAD LOCKER to recoil starter fixing bolts.

Tools:

Valve adjuster
Feeler gauge
Material:
Thread Locker

ENGINE IDLE SPEED

Inspect initially at 20 hours run-in and every 50 hours or 500km thereafter.
Start the engine and warm it up for several minutes, measure engine speed with a tachometer. Set the engine idle speed between 1300~1500 Rpmby turning the throttle stop screw of carburetor.
Engine idle speed: 1400 Rpm±100Rpm

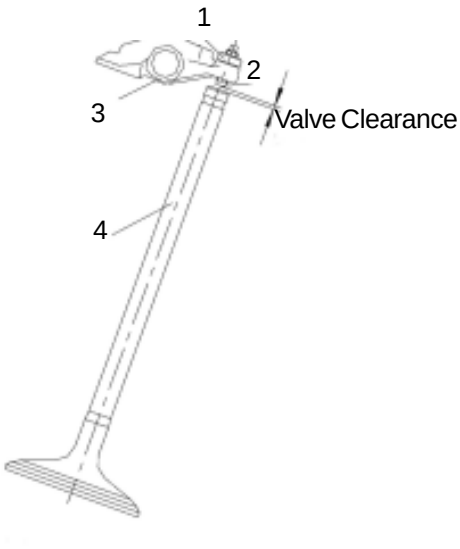
NOTE:

Make this adjustment when the engine is hot
Tool: Tachometer

SPARK PLUG

Inspect initially at 20 hours run-in and every 100 hours or 1000km thereafter. Replace every 6000km.
Remove the spark plug with a special tool
Specification: DER7EA-9(NGK)

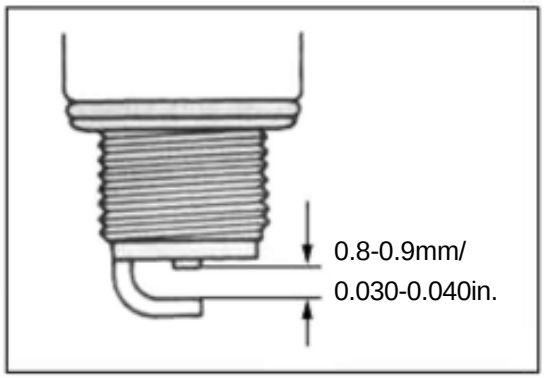
If the electrode is extremely worn or burnt, or spark plug has a broken insulator, damaged thread, etc, replace the spark plug with a new one.



1.Nut 2.Valve Clearance
3.Rocker Arm 4.Valve

Connected with Ignition Coil

In case of carbon deposit, clean with a proper tool.



SPARK PLUG GAP

Measure the spark plug gap with a feeler gauge.
Out of specification: → Adjust
Spark plug gap: 0.8-0.9mm/.030-.040in.

CAUTION:

Check the thread size and reach when replacing the spark plug. If the reach is too short, carbon will be deposited on the screw portion of the spark plug hole and engine damage may result.

Installation:

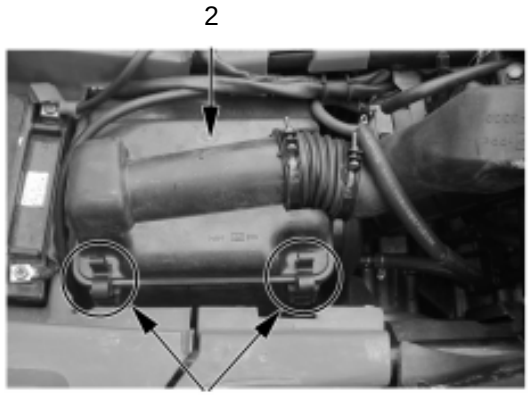
CAUTION:

To avoid damaging the cylinder head threads; first, tighten the spark plug with fingers, and then tighten it to the specified torque using the spark plug wrench.

Tightening Torque: 18 **N.m**
Tool: Spark Plug Wrench, Feeler Gauge

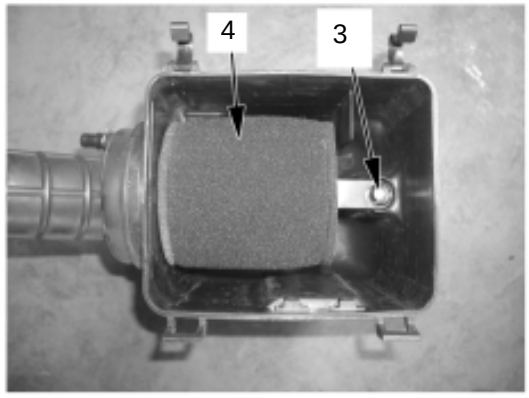
Air Filter

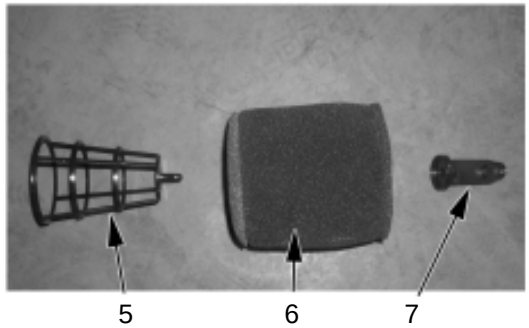
Inspect every 50 hours or 500 km/300miles, clean it every 1000km/600miles if necessary.
If the air cleaner is clogged with dust, intake resistance will be increased, with a resultant decrease in power output and an increase in fuel consumption.
Check and clean the air filter as following:
Remove fixing clamp 1and top cover 2.



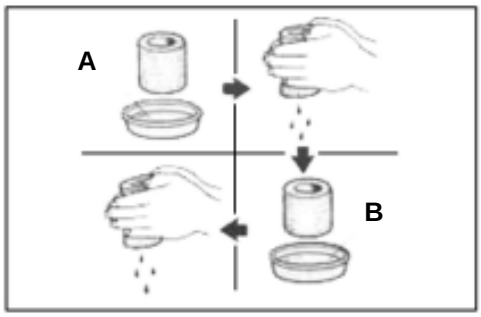
NOTE:

Be careful not to drop the o-ring into the air filter box that is attached to the air filter top cover.
Loosen screw 3, remove filter element 4, separate support 5, filter element 6 and filter element seat 7.
-Fill a wash pan of a proper size with a non-flammable cleaning solvent A. Immerse the filter element in cleaning solvent and wash it.
-Press the filter element between the palms of both hands to remove the excess solvent. Do not twist or wring the element or it will tear.
-Immerse the element in engine oil B, and then squeeze out the excess oil leaving the element slightly wet.



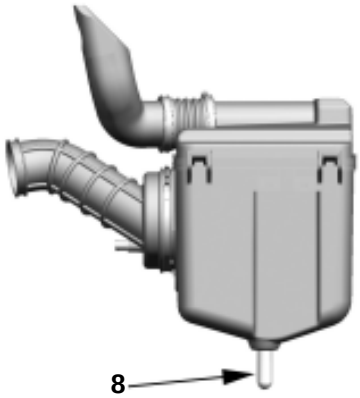


A--Non-flammable cleaning solvent
B–Engine oil SAE#30 or SAE15W/40.
Never use with gasoline or low flash point solvents to clean the filter element



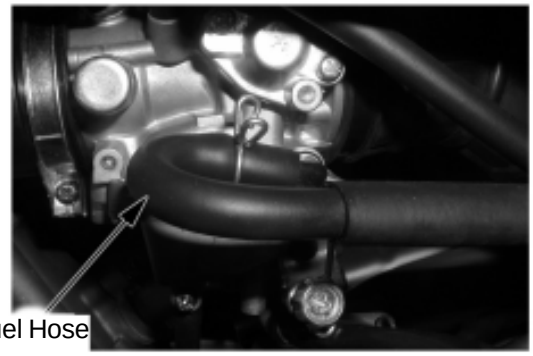
Inspect the filter element for tears.
torn element must be replaced.

NOTE:
The surest way to accelerate engine wear is to operate the engine without the element or with torn element. Make sure that the air filter element is in good condition at all times.
If driving under dusty conditions, clean the air filter element more frequently.



Remove the drain plug 3 of air box to drain out any water.

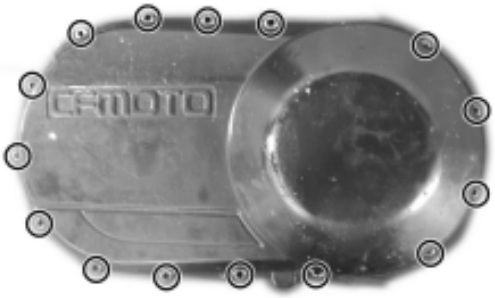
Fuel Hose
Inspect every 100 hours or 1000km/600miles, replace every 4 years.
Inspect the fuel hose for damage and fuel leakage.
If any damage is found, replace the fuel hose with a new one.



Drive Belt
Removal:
Remove CVT cover

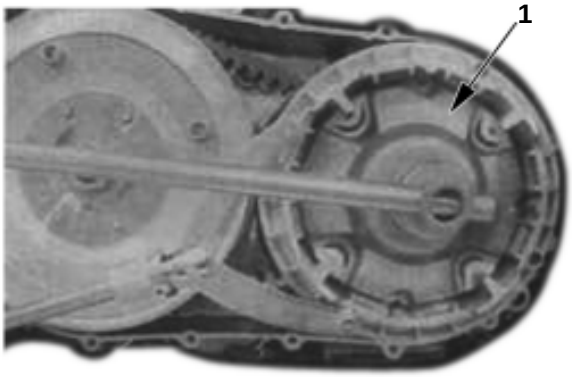
Hold the primary sheave with special tool and loosen primary sheave nut.

Special Tool: Rotor Holder



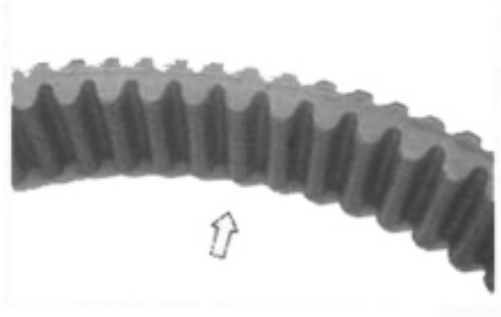
Remove primary sliding sheave 1;
Hold the secondary sheave with special tool and loosen secondary sheave nut.
Remove secondary sheave together with drive belt.

Special Tool: Rotor Holder



Remove drive belt from secondary sheave.

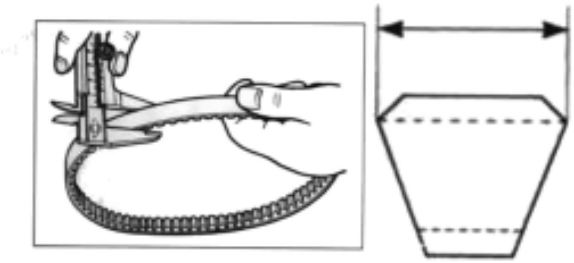
Inspection:



Inspect drive belt for wear and damage.
If any cracks or damages are found,
replace drive belt with a new one.

Inspect drive belt for width, if width is
out of service limit, replace drive belt with a new one.
Service Limit: 33.5mm/1.32in.
Tool: Vernier Caliper

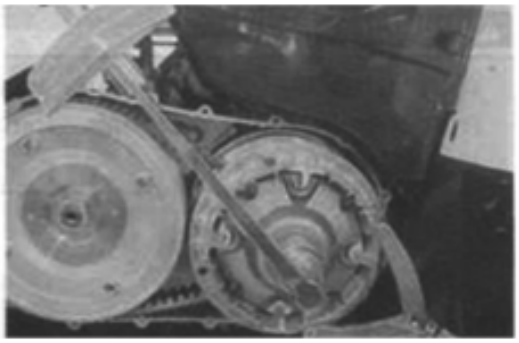
Installation:



Reverse the removal procedure for installation.
Pay attention to the following:
Insert drive belt, as low as possible,
between secondary sliding sheave and primary
fixed sheave.
Hold secondary sheave with a special tool and
tighten the nut to the specified torque.
Nut, Secondary Sheave: 115 **N.m**/84 **lbs.ft.**

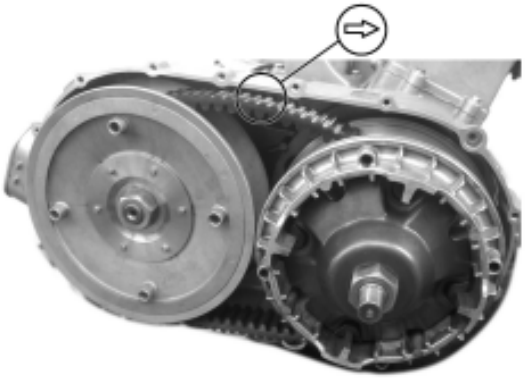
Install primary sheave and nut. Hold the primary
sheave with a special tool and tighten the nut
to the specified torque.
Nut, Primary Sheave:115**N.m**/84 **lbs.ft.**

Turn primary sheave, until the drive belt is
properly seated and both the primary and
secondary sheaves rotate together smoothly
and without slipping.



CAUTON:

-Fit the drive belt with the arrow on the drive
belt points toward normal turning direction.
-The drive belt contact surface of the driven
face should be thoroughly cleaned.

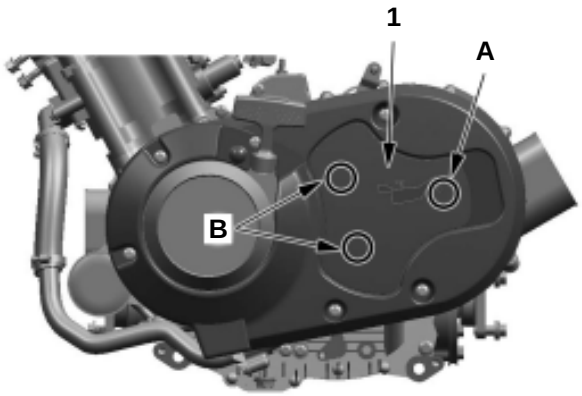


Install CVT cover.

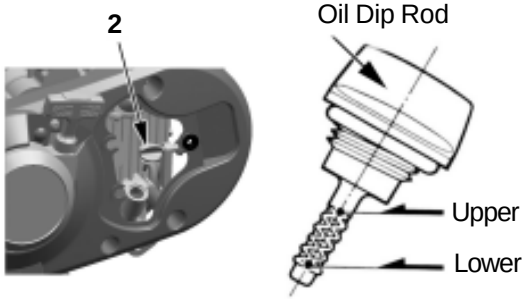
Inspection of Lubrication System

Replace engine oil and oil filter initially at 20 hours or 250km and every 100 hours or 1000km thereafter.
Inspect the engine oil at every 10 hours.

Check Engine Oil Level



-Keep the engine in a level position.
-Remove the fixture A, fixture B, then remove the left side cover 1.
-Remove oil dip rod 2
-Clean oil dip rod, insert oil dip rod but do not tighten it.
-Take out oil dip rod and check if oil is between upper and lower limit.
-If the engine oil is insufficient, fill more oil until the sufficient oil is obtained.
Engine Oil: SAE15W/40 classification SF or SG

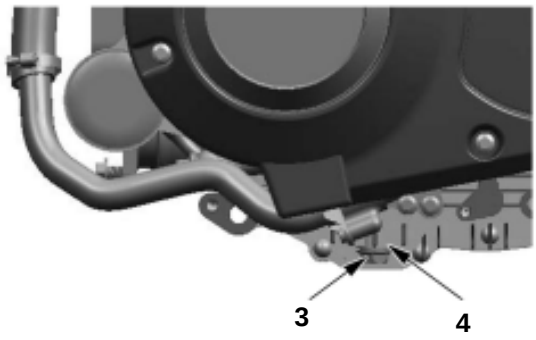


NOTE:

-Keep the engine in a level position
-Do not tighten oil dip rod when measuring oil level

Replacing Engine Oil

-Remove left side cover 1, oil dip rod 2, drain bolt 3 and washer 4.
-Drain out the engine oil while the engine is still warm.
-Clean oil dip rod, drain bolt and washer with solvent.
-Install washer and drain bolt.



Drain Bolt: 30 **N.m**/22 **lbs.ft**.

-Fill engine oil. (about 1900ml)

-Install oil dip rod, start the engine and allow it to run for several minutes at idling speed.
-Turn off the engine and wait for about 3 minutes, and then check the oil level on the dipstick.
Caution:
The engine oil should be changed when the engine is warm. If the oil filter should be replaced, replace engine oil at the same time.

Replacing Oil Filter

-Remove relative parts (see Replacing Engine Oil)
-Remove oil filter 1 with the special tool
-Install washer and drain bolt
-Install new oil filter with the special tool
-Fill engine oil (about 2000ml) and check (see Replacing Engine Oil)

Tool: Oil Filter Wrench

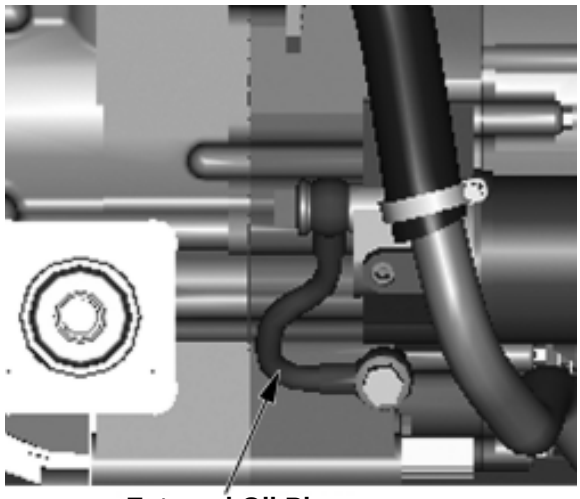
Engine Oil Capacity

When replacing oil: 1.9L/2.01Qts
When replacing oil filer: 2.0 L/2.11Qts
Engine overhaul:2.2 L/2.32Qts

Inspection of External Oil Pipe

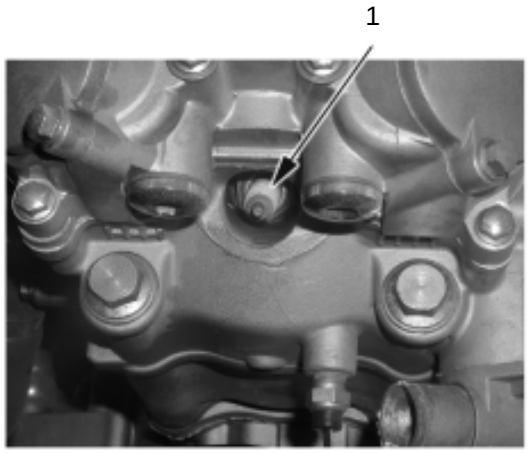
Check external oil pipe for leakage or damage.

Leakage or Damage: → Replace



Inspection of cylinder pressure

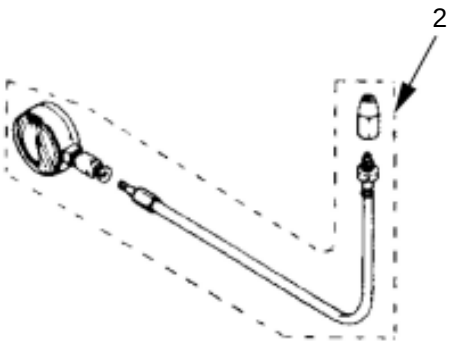
Check cylinder pressure is necessary.
Cylinder Pressure: 1000kpa/145Psi



A lower cylinder pressure may be caused by:
-Excessive wear of cylinder;
-Wear of piston or piston ring;
-Piston ring stuck in groove;
-Valves not seating;
-Damaged cylinder gasket or other defects.

NOTE: When cylinder pressure too low, check the above items.

Testing Cylinder Pressure



NOTE: Before testing of cylinder pressure, make sure that cylinder head bolts are tightened to the specified torque and valve clearance has been properly adjusted.

-Warm up the engine before testing;
-Make sure battery is fully charged;
-Remove spark plug 1;
-Install cylinder pressure gauge 2 in spark plug hole and tighten nut;
-Keep throttle full open;
-Press start button crank the engine a few seconds.
Record the maximum reading of cylinder pressure.
Tools: Cylinder Pressure Gauge
Adaptor

Inspection of Oil Pressure

Oil Pressure: 18.5-25Psi at 3000 Rpm;

Lower or higher oil pressure may be caused by:

Ⅰ Oil pressure is too low

-Clogged oil filter;

-Leakage from oil passage;

-Damaged O-ring;

-Oil pump failure;

-Combination of above items;

Ⅱ Oil pressure is too high

-Oil viscosity is too high;

-Clogged oil passage;

-Combination of above items;

Testing Oil Pressure

-Remove bolt 1;

-Connect tachometer 2 with ignition coil

-Install oil pressure gauge 3 and joint seat to main oil gallery.

-Warm up engine as per following:

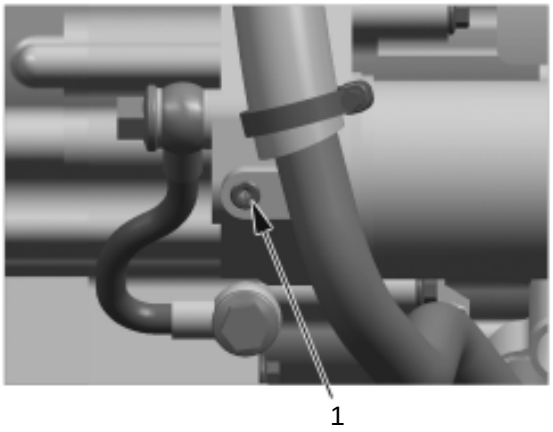
Summer: 10 minutes at 2000Rpm

Winter: 20 minutes at 2000Rpm

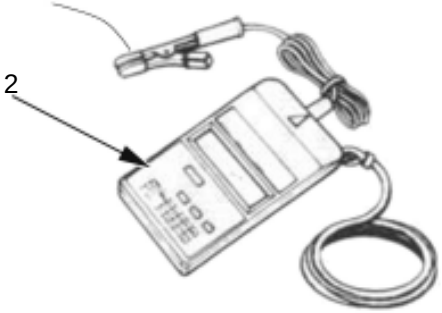
After warming up, increase engine speed to 3000Rpm, and record readings of oil pressure gauge.

-After testing, apply thread locker to the thread in the hole of main oil channel. Install bolt and tighten to the specified torque.

Tighten torque:23**N.m**

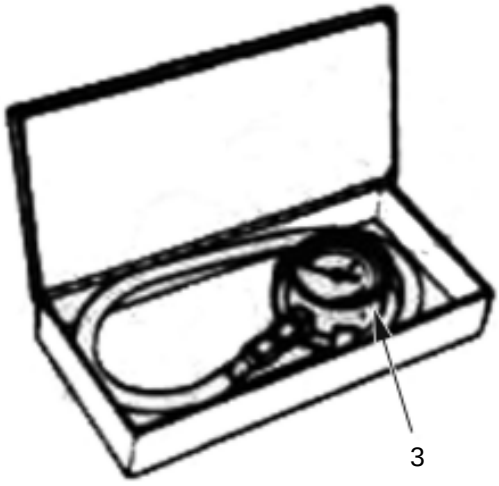


Connected with Ignition Coil



Tools:Oil pressure gauge

Tachometer



Inspection of Clutch Engagement and Lock-up

CF196-S engine is equipped with a centrifugal type automatic clutch.
Before checking the initial engagement and clutch lock-up two inspection checks must be performed to thoroughly check the operation of the drive train.

Ⅰ Initial Engagement Inspection

-Connect tachometer to ignition coil
-Start engine
-Shift gear lever to “High” position
-Slowly increase throttle and note down the engine speed Rpm when the vehicle starts to move forward.
Engagement speed:1800Rpm-2400Rpm
If the engagement speed is out of the above range, check the following:
-Clutch shoes.
-Clutch shoe wheel.
-Primary and secondary sheave.
Refer to Chapter 12 for inspection of clutch.

Ⅱ Clutch Lock-up Inspection

-Connect the tachometer to ignition coil;
-Start the engine;
-Shift gear lever to ”High” position;
-Apply front and rear brakes as firmly as possible;
-Fully open the throttle for a brief period and note the maximum engine speed obtained during the test cycle.
Lock-up Speed: 3300Rpm-3900Rpm

WARNING:
Do not apply full power for more than 5 seconds or damage to clutch or engine may occur.
If the lock-up speed is out of the above range, check the following:
-Clutch shoes.
-Clutch wheel.
-Primary and secondary sheave.
Refer to Chapter 12 for inspection of clutch.

Tool: Tachometer

Connected with Ignition Coil

Overhaul Info

Caution:

• If the radiator cap is opened when the coolant temperature is above 100℃/212℉,the pressure of coolant temperature will go down and get boiled rapidly. The steam jet may cause danger and injury. Cover the cap with a piece of cloth after the coolant temperature goes down and open the cap.

•Inspection of coolant should be done after the coolant is fully cooled.

• Coolant is poisonous. Do not drink or splash it to skin,eye or cloth.

-If coolant splashes in eyes, throughly wash your eyes with water and consult a docter.

-If coolant splashes on your clothes, quickly wash it away with water and then with soap and water.

-If coolant is swallowed, induce voimting immediately and see a physician.

-Store the coolant properly and keep it away from reach of the children.

• Check radiator fins for mud block and/or damage. Correct the bent fins. Clean off the mud with water and compressed air. Replace with a new one, if the damaged fin area reached 20%

•The overhauling of the water pump can done without removing the engine.

•Coolant filling is carried through reservoir tank. Do not open the radiator cap except when disassembling the cooling system for filling or drainage of coolant.

•Don't stain the painting parts with coolant. In case of any coolant stains, flush with water immediately.

• After disassembly of the cooling system, check the joints for leakage with a radiator cap tester(available in the market).

• Refer to Chapter 10 for overhauling of temperature transducer.

Inspection standard

Item		Standard
Coolant capacity	Full capacity	1140ml/38ounces
	Reservior tank	300ml/10ounces
	Standard density	50%
Opening pressure of radiator cap		108kpa(1.1kgf/㎠)/15.66Psi
Thermostat	Valve open temperature	71 ± 3℃/159.8 ℉
	Full open lift	under 95℃,3.5£-4.5mm

Tightening torque:

Drainage bolt,water pump: 8**N** • **m**(0.8kgfm)

Water pump impeller: 10**N** • **m**(1.0kgf • m)

Water Temperature Rises Too Fast

- Improper radiator cap.
- Air in the cooling system.
- Malfunction of water pump.
- Malfunction of thermostat（thermostat is not open).
- Clogged of radiator pipe of cooling pipe.
- Damaged or clogged radiator fins.
- Coolant is not enough.
- Faulty or malfunction of fan motor.

No Rise or Slow Rise of Water Temperature

- Malfunction of thermostat(thermostat isn't closed).
- Faulty circuit of water temperature display.

Water Leakage

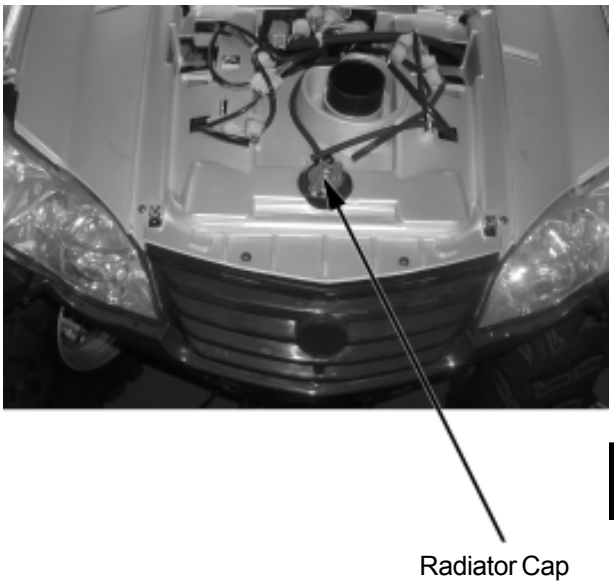
- Poor water seal.
- O-rings are aged, damaged or improperly sealed.
- Washers are aged, damaged or improperly sealed.
- Improper installation of pipes.
- Pipes are aged, damaged or improperly sealed.

Performance Overhaul

Inspection of coolant density

Caution:
Be sure to open the radiator cap after coolant is cooled.

Remove:
Front top cover (→2-4)
Radiator cap(counter clockwise)



Check with a densimeter if the density of coolant fits the temperature of using place;
Check coolant for stains

Inspection of the radiator cap

Caution
Be sure to open the radiator cap after coolant is cooled

Remove:
-Front top cover (→2-4)
-Radiator cap (→4-3)

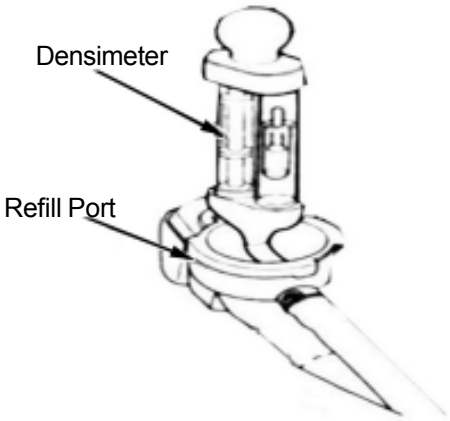
CAUTION:

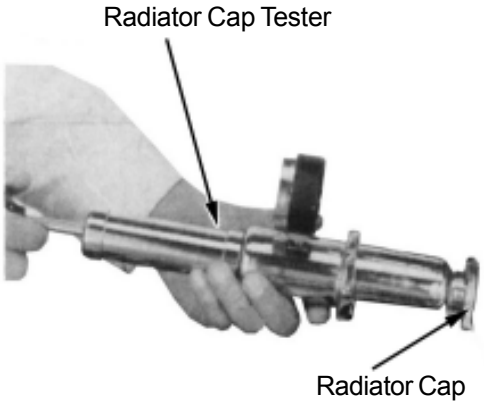
Apply water on the sealing surface of radiator cap, when attaching the tester to the radiator cap

Apply the specified pressure(radiator cap opening pressure) for 6 seconds and make sure there is no pressure drop.

Opening pressure of radiator cap:

108kPa(1.1 kgf/cm²)/15.66Psi





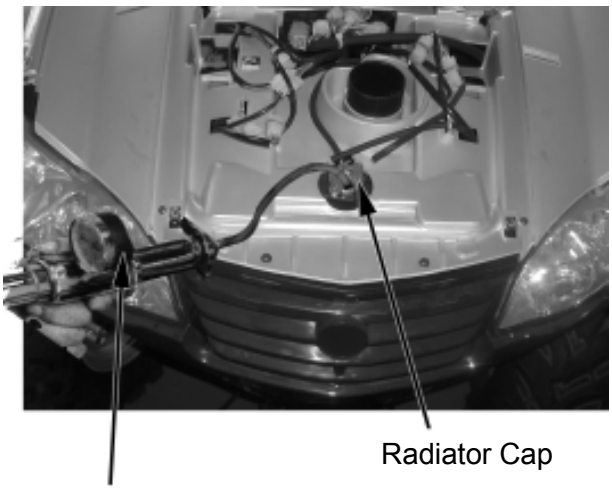
Pressure testing of cooling system

Apply the specified pressure(radiator cap opening pressure) for 6 seconds and make sure that there is drop in pressure

CAUTION:

Do not apply pressure over the specified pressure [108kPa(1.1 kgf/cm^2)]/15.66Psi,or the cooling system may be damaged.

In case there is any pressure leakage,check the pipe, joint parts,joints of water pump and drainage (→4–5)



Replacing Coolant,Air Discharge

Preparation of coolant

CAUTION:

Coolant is poisonous,DO NOT drink or splash it to skin,eyes and clothes

-If coolant splashed in your eyes,throughly wash your eyes with water and consult a doctor

-If coolant splashed on your clothes,quickly wash it away with water then with soap and water

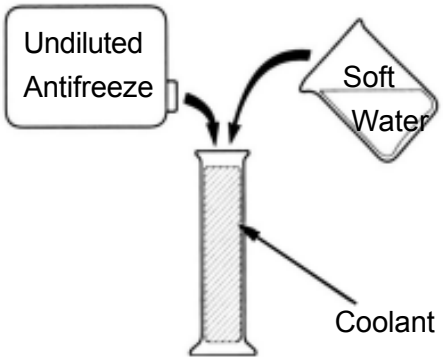
-If coolant is swallowed,induce vomit immediately and see a physician

-Store the coolant properly and keep it away from reach of children

CAUTION:

Mix the anti-freeze(undiluted) with soft water according to the temperature 5℃ lower than the actual lowest temperature in the operation area.

Coolant should be made from undiluted anti-freeze with soft water.



Standard density of coolant: 50%

Recommended coolant: CFMOTO coolant (Direct application without having to be diluted)

Drainage of Coolant

Remove the Radiator Cap

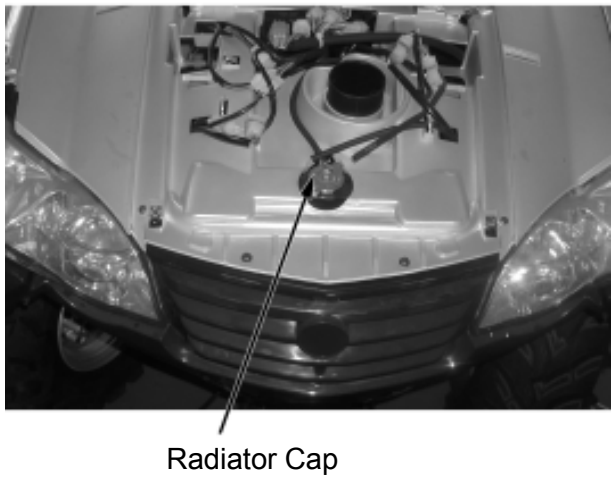
CAUTION:

Open the radiator cap after the coolant is cooled down.

Remove:

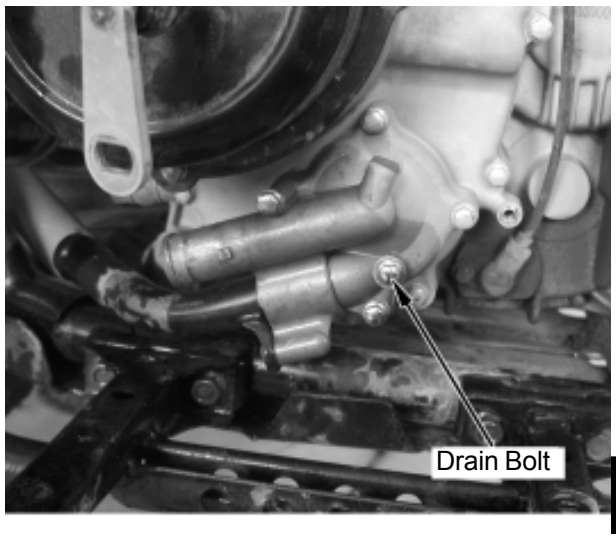
-Front top cover(→2-8)

-Radiator Cap(→4-3)



Remove Drain Bolt

Remove drain bolt, seal gasket from water pump, drain coolant.
After drainage, assemble new seal gasket and drain bolt and tighten.



Reservoir Tank

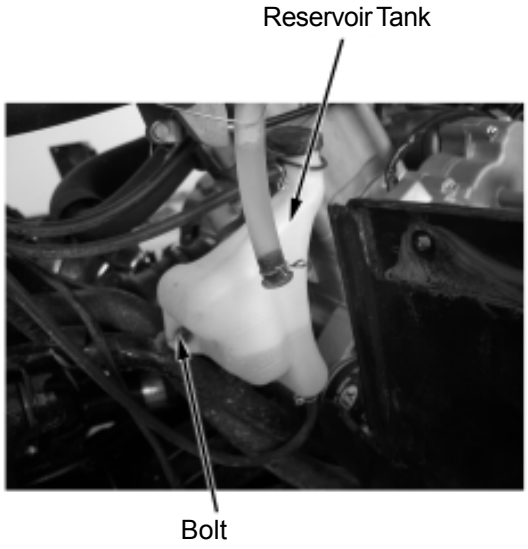
Remove:
-Seat (→ 2-3)
-Left Side Cover (→2-6)
-Two bolts of reservoir tank
-Water hoses of reservoir tank

Remove reservoir tank

Drain coolant from reservoir tank

Wash clean the reservoir tank

Install:
-reservoir tank
-water hoses of reservoir tank



Adding Coolant

Add coolant through filling port

Refill Port

Start the engine and discharge air from cooling system. Check from filling port that air is fully discharge from cooling system and install the radiator cap

Remove reservoir tank cap and add coolant till the upper limit

Caution:

Check coolant level when the vehicle is on an level ground

Discharge

Discharge the air from cooling system according to the following steps:

1.Remove drain bolt（→4−5）,discharge air and install it.

2.Start the engine and run it several minutes at idle speed.

3.Quickly increase throttle 3~4 times to discharge air from cooling system.

4.Add coolant till filling port.

5.Repeat step 2&3 till no more coolant can be refilled.

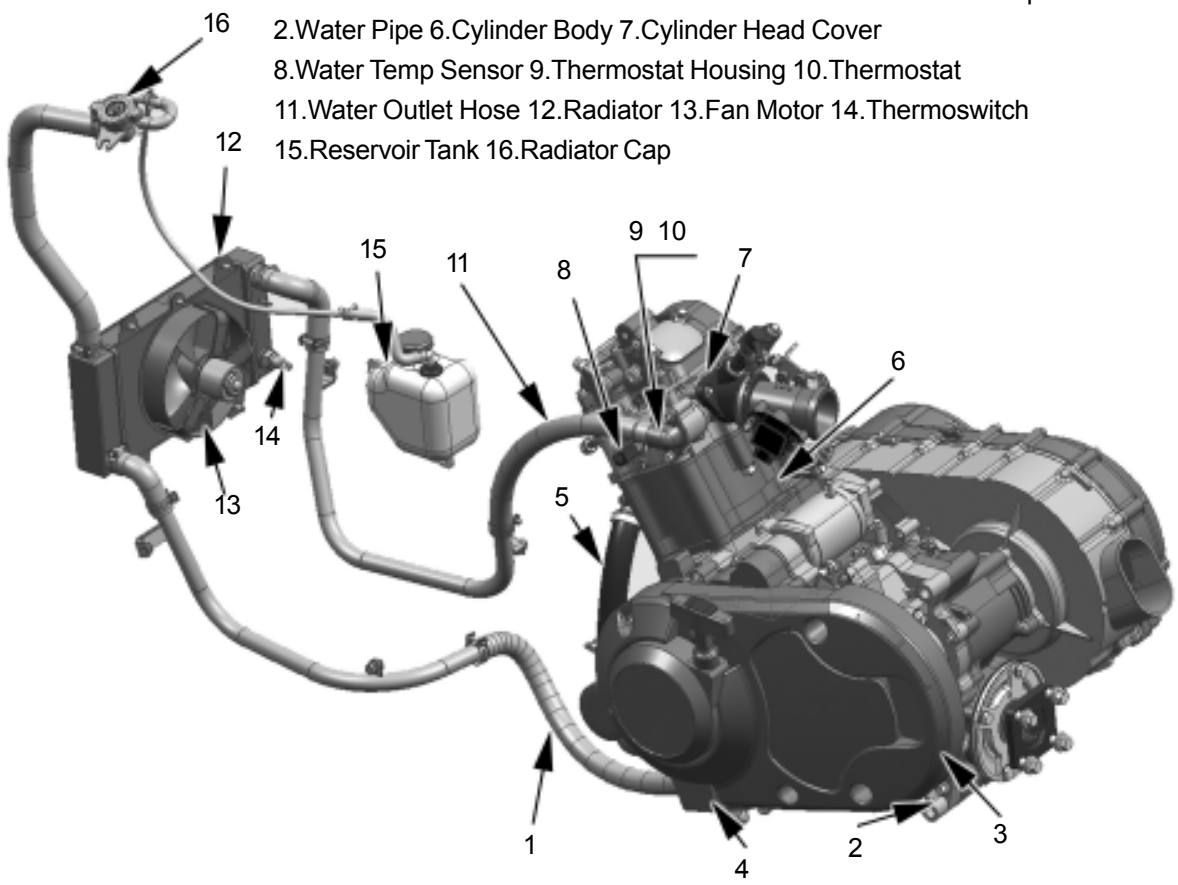
6.Check coolant level in reservoir tank and refill till upper limit,install reservoir tank cap.

Upper Limit

Lower Limit

Cooling System

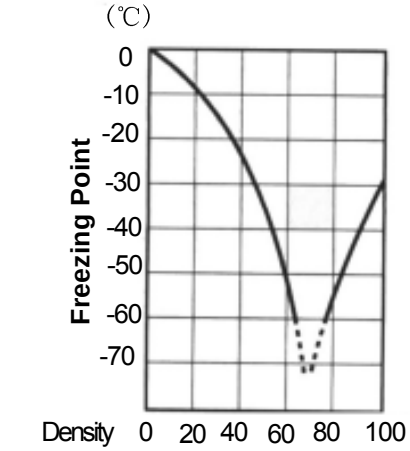
1.Water Inlet Hose 2.LH Crankcase 3.LH Sidecover 4.Water Pump
2.Water Pipe 6.Cylinder Body 7.Cylinder Head Cover
8.Water Temp Sensor 9.Thermostat Housing 10.Thermostat
11.Water Outlet Hose 12.Radiator 13.Fan Motor 14.Thermoswitch
15.Reservoir Tank 16.Radiator Cap

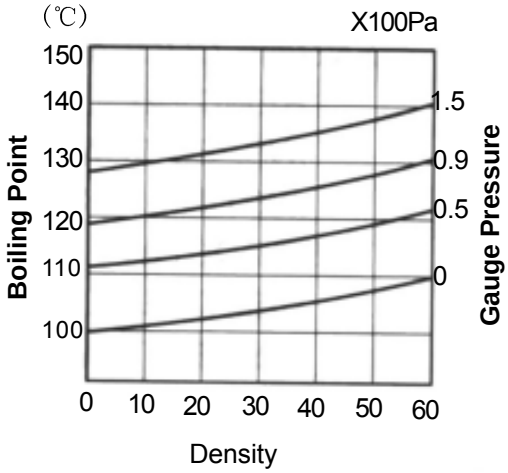


△ Engine Coolant

The cooling used in cooling system is mixture of 50% distilled water and 50% ethylene glycol antifreeze. This 50:50 mixture provides the optimized corrosion resistance and fine heat protection.The coolant will protect the cooling system from freezing at temperature above -30℃,the mixing ratio of coolant should be increased to 55% or 60% according to the figure on the right.

Anti-Freeze Density	Freezing Point
50%	-30℃
55%	-40℃
60%	-55℃





NOTE:

- Use high quality ethylene glycol base antifreeze and mixed with distilled water.Never mix alcohol base antifreeze and different brands of antifreeze
- The ratio of antifreeze should not be more than 60% or less than 50%
- Do not use anti-leak additive

WARNING:

- DO NOT open radiator cap when the engine is still hot.Or you may be injured by scalding fluid or steam;
- Coolant is harmful.DO NOT swallow or stain your skin or eyes with coolant.In case of accidental swallow or stain,flush with plenty of water and consult the doctor immediately;
- Keep coolant away from reach of children

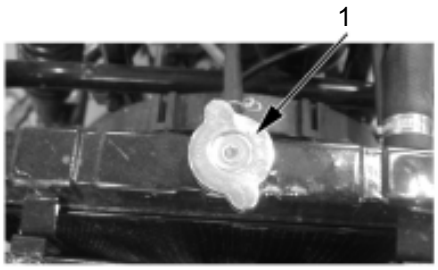
△ Inspection of Cooling Circuit

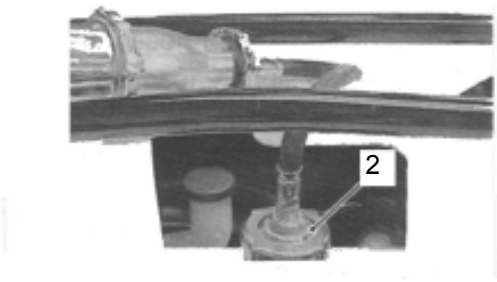
- Remove radiator cap 1 and connect tester 2 filler

WARNING:

DOT NOT open the radiator when the engine is still hot

- Give a pressure of 105kPa/15Psi and check if the cooling system can hold this pressure for 10 seconds.
- If the pressure drops during 10 seconds,it indicates that there is leaakage with the cooling system.In this case,check the complete system and replace the leaking parts or components.





WARNING:

- When removing the radiator cap tester,put a rag on the filler to prevent splash of coolant.
- DO NOT allow a pressure to exceed the radiator cap release pressure.

△ Inspection and Cleaning of Radiator and Water Hoses

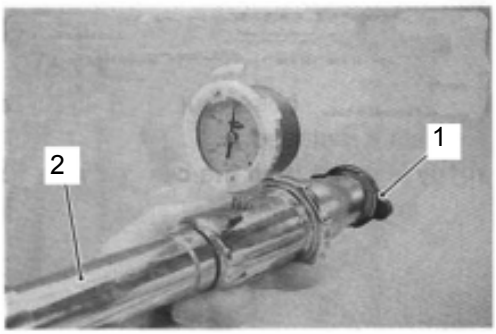
Radiator Cap

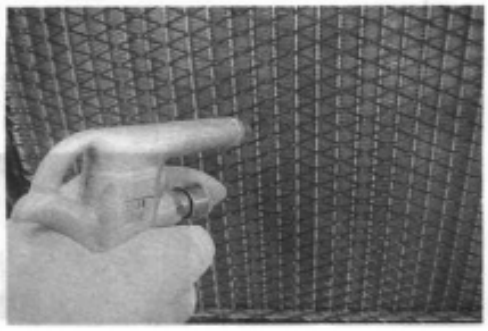
●Remove radiator cap 1.

●Install radiator cap to cap tester 2.

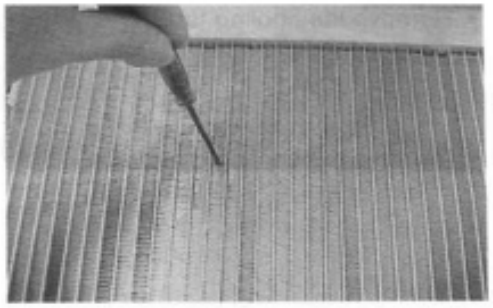
●Slowly increase pressure to 108kPa and check if the cap hold the pressure for at least 10 seconds.

●If the cap can not meet the pressure requirement, repalce it.





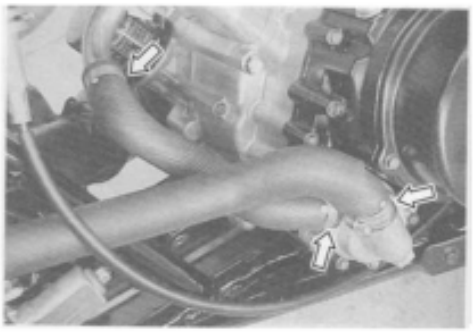
Radiator Cap Valve Opening Pressure:
Standard:108kPa/15.66Psi
Tool:Radiator Cap Tester



Radiator Inspection and Cleaning

●Remove dirt or trash from radiator with compressed air.

●Correct the radiator fins with a small screwdriver.

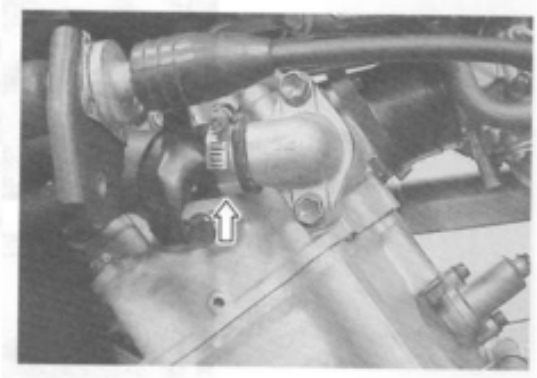


Radiator Hose Inspection

●Check radiator hoses leakage or damage.If the hoses are leakaged and damaged,replace them.

●Check tightening of clamps.Replace the clamps if necessary.

●After inspection and cleaning of radiator and hoses, check coolant level.Fill coolant if necessary.

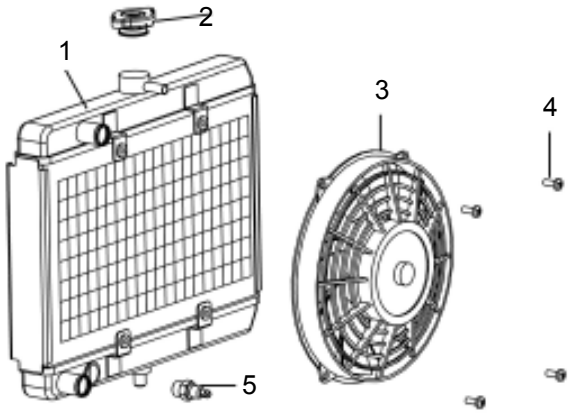


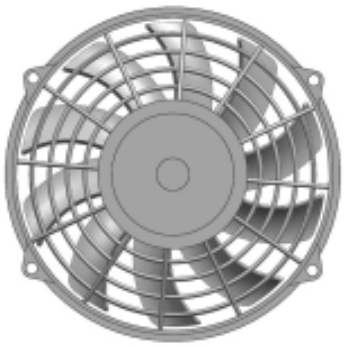
Inspection of Fan Motor

●Remove fan motor from radiator.
●Turn the vanes and check if they can turn smoothly.
●Check fan motor.Make sure that the battery applies 12 volts to the motor and the motor will run at full speed while the ammeter will indicate the ampere not more than 5A.
If the motor does not work or the ampere exceeds the limit,replace the motor
●Installation:Apply a little thread locker to the bolts and tighten to the specified torque.

Fan Motor Bolt Tightening Torque:10N.m

1.Radiator 2.Radiator Cap 3.Fan Motor
4.Mounting Bolt 5.Fan Motor 6.Thermoswitch

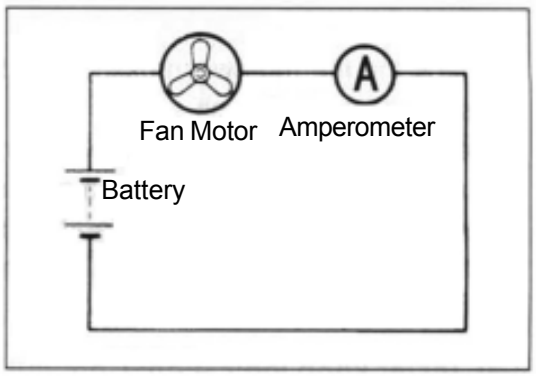




Inspection of Thermoswitch

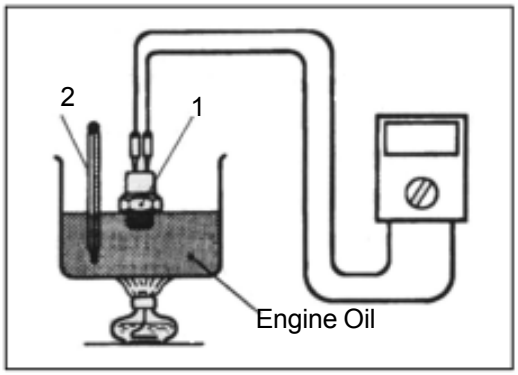
●Remove thermoswitch.
●Check the thermoswitch for closing or opening by testing it at the bench as illustrated. Connect the thermoswitch 1 to the circuit tester,place it in a vessel with engine oil. Place the vessel above a stove.
●Heat the oil to raise the temperature slowly and take the reading from thermostat 2 when the thermoswitch closes and opens.

Tool:ammeter
Thermoswitch Operating Temperature:
Standard:(OFF-ON):Approx.88℃/190℉
(ON-OFF):Approx.82℃/180℉

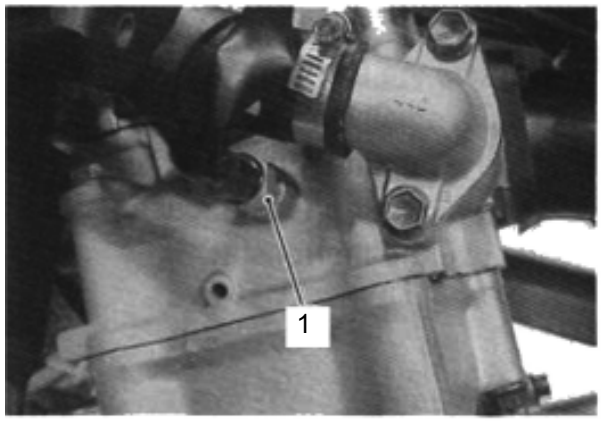


NOTE:

●Avoid sharp impact on thermoswitch.
●Avoid contact of thermoswitch with thermometer or vessel
●Installation:Use a new O-ring 3 and tighten the thermoswitch to the specified torque:
Thermoswitch Tightening Tirque:17N.m
●Check coolant level after installation of thermoswitch. Fill coolant if necessary.



△ Inspection of Water Temperature Sensor

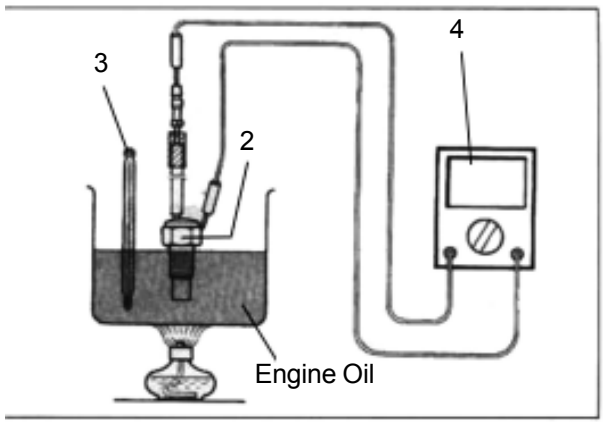


●Plcae a rag under water temperature sensor 1 and remove it from cyclinder head.

●Check the resistance of water temperature sensor as illustrated on theright. Connect the temperature sensor 2 to the circuit tester,place it in a vessel with engine oil.Place the vessel above a stove.

Tool: ohmmeter, thermometer

●Heat the oil to raise the temperature slowly and take the reading from ohmmeter 4 and thermometer 3.



B Resistance and Water Temperature

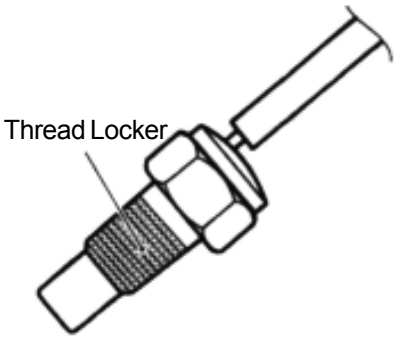
Temperature (℃)	50	80	100
Resistance (Ω)	154±16	52±4	27±3

A 、 C Resistance and Water Temperature

Temperature (℃)	-0	25	80	110
Resistance (kΩ)	11-194	1.825-2.155	0.303-0.325	0.1383-0.1451

●Installation:Apply a little thread locker and install it to the cylinder head by tightening to the specified torque.

Water Temperature Sensor Tightening Torque: 10N.m



NOTE:

●Avoid sharp impact on terperature sensor.

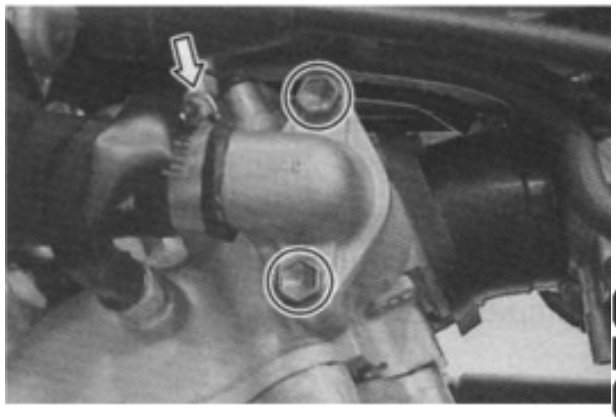
●Avoid contact of temperature sensor with thermom-eter or vessel.

●After installation,check the coolant level.Fill coolant if necessary.

△ Inspection of Thermostat

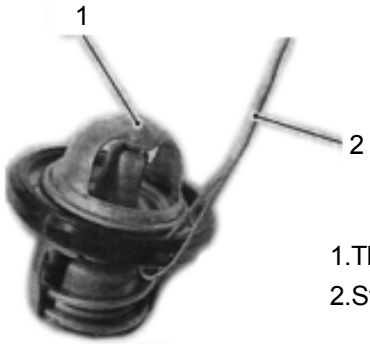
●Remove thermostat case.

●Remove thermostat.



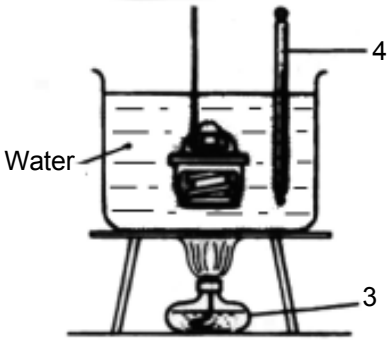
●Check thermostat pellet for cracks.If necessary, replace it.

●Test the thermostat according to the following steps:
☆Pass a string between thermostat flange as illustrated on the right.



1.Thermostat
2.String

☆ Immerse the thermostat in a beaker with water. Make sure that the thermostat is in the suspended position without contact to the vessel.Heat the water by placing the beaker above a stove and observe the temperature rise on a thermometer



3.Stove 4.Thermostat

☆ Take the temperature reading from thermometer when the thermostat valve opens

Thermostat Valve Opening Temperature:

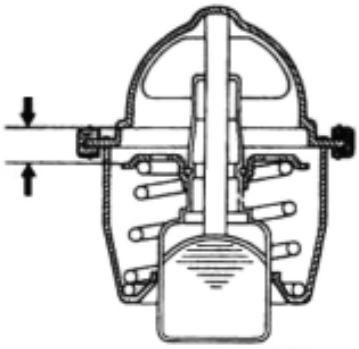
71 ± 3℃

Tool:Thermometer

☆ Keep heating the water to raise the water temperature.When the water temperature reaches the specified valve, the thermostat valve should have been lifted by 3.5-4.5mm

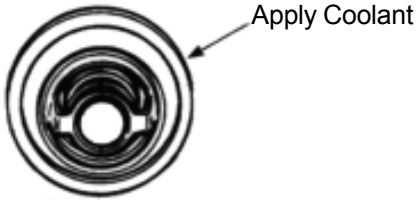
Lift standard of thermostat valve:

water temperature 95℃，lift standard is 3.5-4.5mm



☆If thermotat valve opening temperature or thermostat velve lift does not reach the standards,replace it.

●Inatall thermostat:Reverse the removal procedure for installation



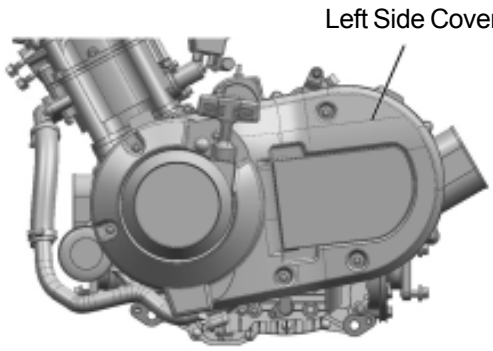
☆Apply coolant to the rubber seal of thermostat

☆ Install thermostat case.Tighten to the specified torque:

Tightening Torques:10N.m

△ Water Pump

Removal and Disassembly

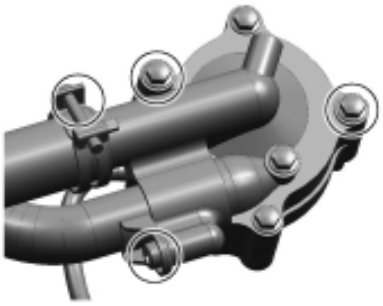


●Remove engine left side cover

●Drain coolant

NOTE: Before draining coolant, check water pump for oil or coolant leakage. In case of oil leakage, check the water pump oil seal, O-ring. In case of coolant leakage, check the water seal

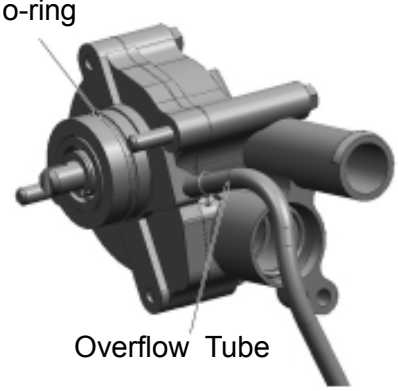
●Remove clamps and water hoses.



●Remove bolts and remove water pump.

o-ring

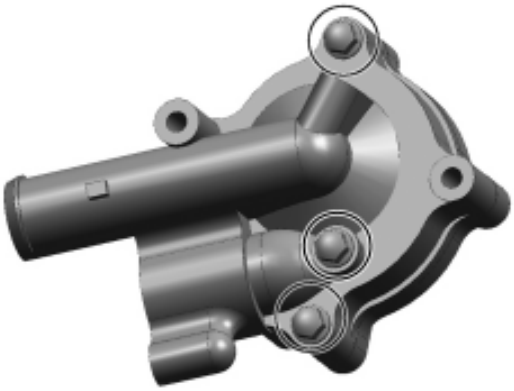
●Remove O-ring.



NOTE:Do not reuse the O-ring.

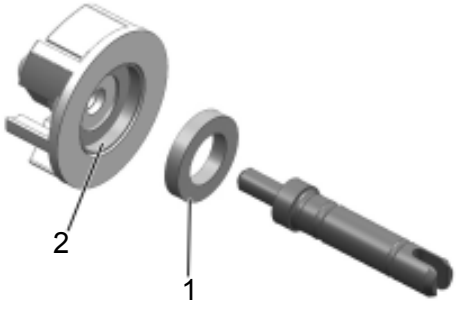
Overflow Tube

●Remove the overflow tube.



●Remove water pump cover screws,water pump cover and gasket.

●Remove ring and impeller .



●Remove seal ring 1 and rubber seal 2 .

●Remove mechanical seal with special tool.

NOTE: The mechanical seal does not need to be moved,if there is no abnormal condition.

NOTE: Do not reuse a removed mechanicalseal.

●Put a rag on the water pump body.

●Reomve oil seal.

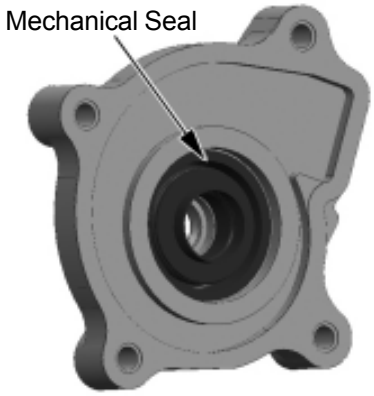
NOTE: The oil seal does not need to be removed,if there is no abnormal condition.

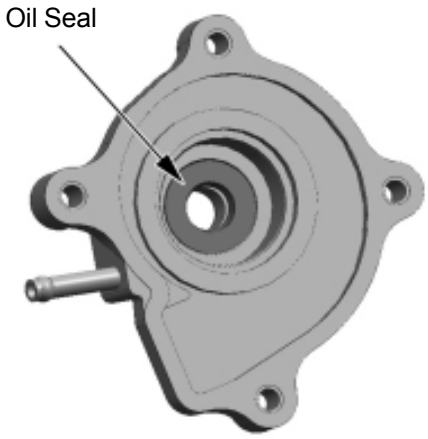
NOTE: Do not reuse a removed oil seal.

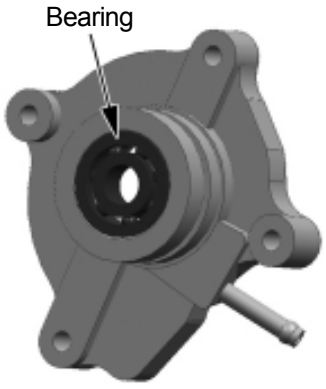
●Remove bearing with special tool.

NOTE: The bearing does not need to be removed,if there is no abnormal noise.

NOTE: Do not reuse a removed bearing.







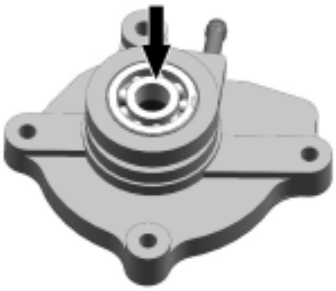
Inspection of Water Pump

☆ Bearing

●Check the bearing clearance by hand,while it is still in the water pump body.

●Turn inner race of bearing to check for abnormal noise and smooth rotation.

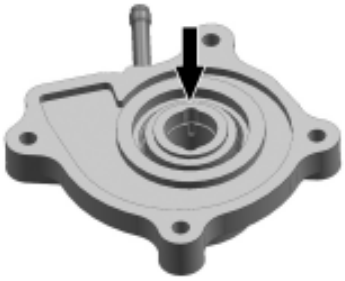
●Replace the bearing,if there is abnormal condition.



☆ Mechanical Seal

●Check mechanical seal for damage,pay attention to the seal face.

●In case of leakage or damage,replace the mechanical seal. If nesessary,also replace the seal ring.

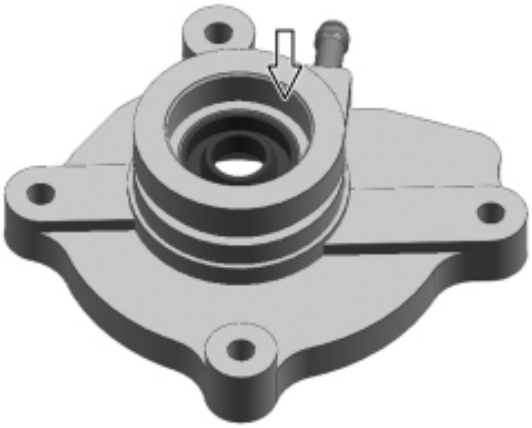


☆ Oil Seal

●Check oil seal for damaged. Pay attention to the oil seal lip.

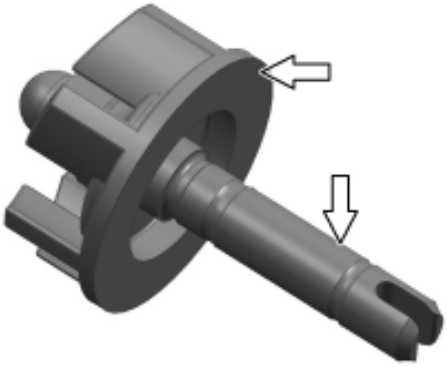
●In case of damage or leakage, replace the oil seal

☆ Water Pump Body



●Checl the mating mace of water pump body with bearing and mechanical seal.If damage,replace it.

☆ Water Pump Impeller



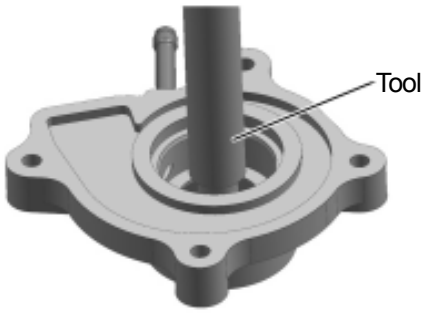
●Check the impeller and shaft for damage.

●If the impeller or shaft are damaged,replace a new part.

Assembly and Installation of Water Pump

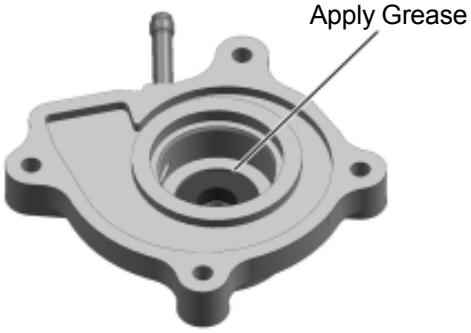
●Install oil seal with special too.

Tool:Oil Seal Installer



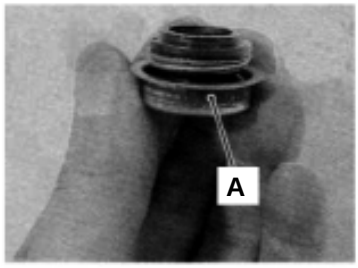
NOTE: The stamped mark on the oil seal faces outside.

●Apply a little grease to the oil seal lip.



●Install mechanical seal with a suitable socket wrench.

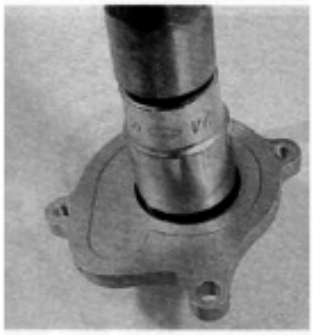
NOTE: Apply sealant to side ”A” of mechanical seal.

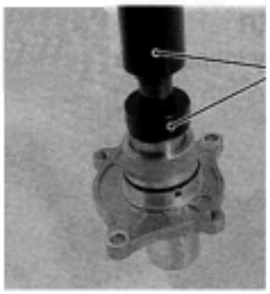


●Install bearing with special tool.

Tool:Bearing Installer

NOTE: The stamped mark on the bearing faces outside.

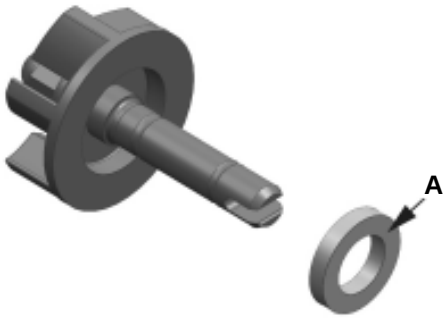




●Install seal ring to impeller.

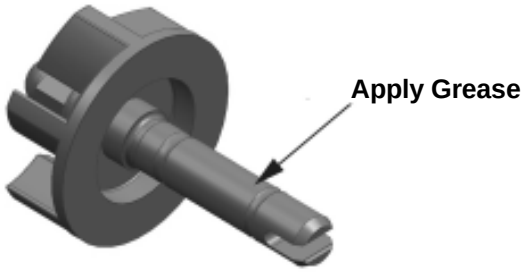
●Clean off the oil and grease from mechanical seal and install into the impeller.

NOTE: ”A” side of mechanical seal faces impeller



●Apply grease to impeller shaft.

●Install impeller shaft to water pump body.

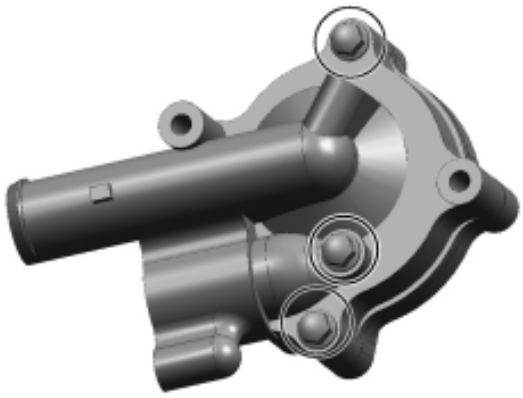


●Install ring to water pump shaft.

●Install new gasket to water pump body.

●Install water pump cover and tighten the bolts and bleed bolt.

Water Pump Cover Bolts Tightening Torque:6N.m



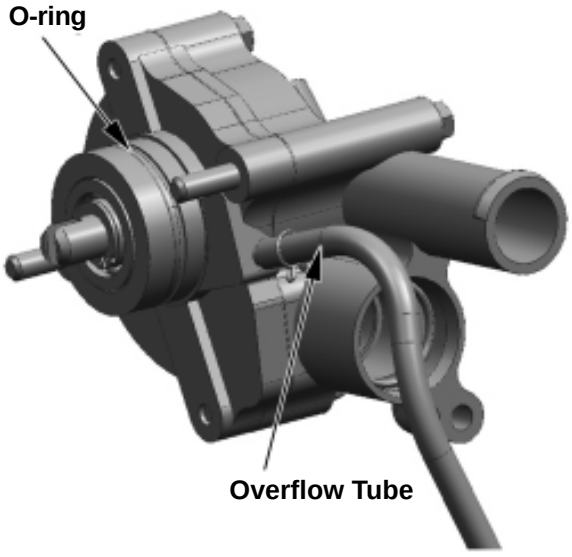
●Check impeller for smooth turning.

●Install the new O-ring.

NOTE:

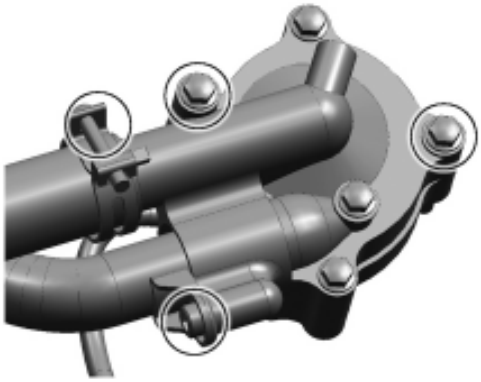
●Use the new O-ring to preventleakage.

●Apply grease to O-ring.



●Install the overflow tubes.

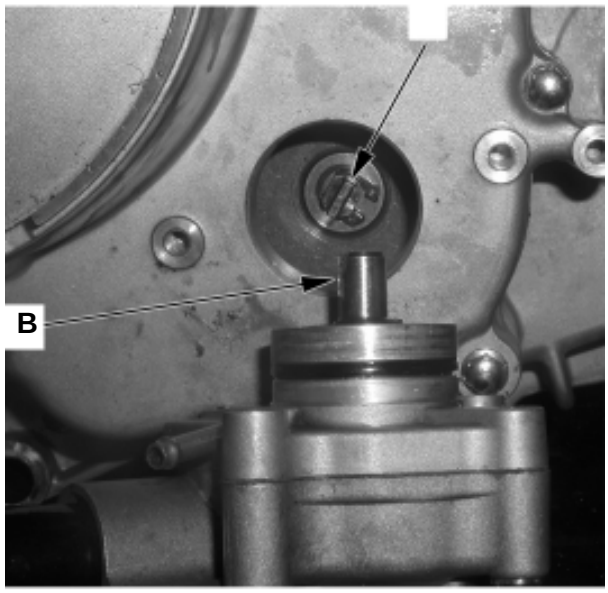
●Install water pump and tighten the bolts to the specified torque.



Water pump bolts tightening torque:

10N.m

NOTE: Set the water pump shaft slot end ”B” to oil pump shaft flat side ”A”.



●Connect water hoses.

●Add coolant.

●Install left side cover.

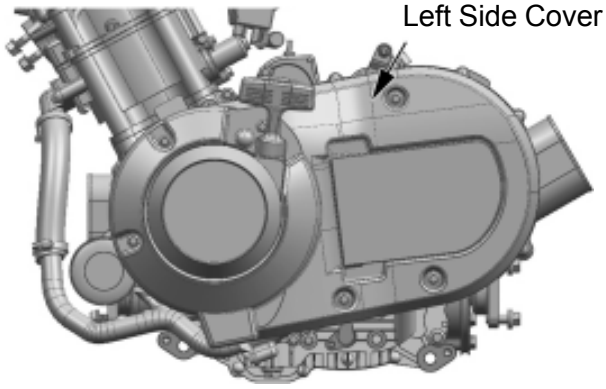
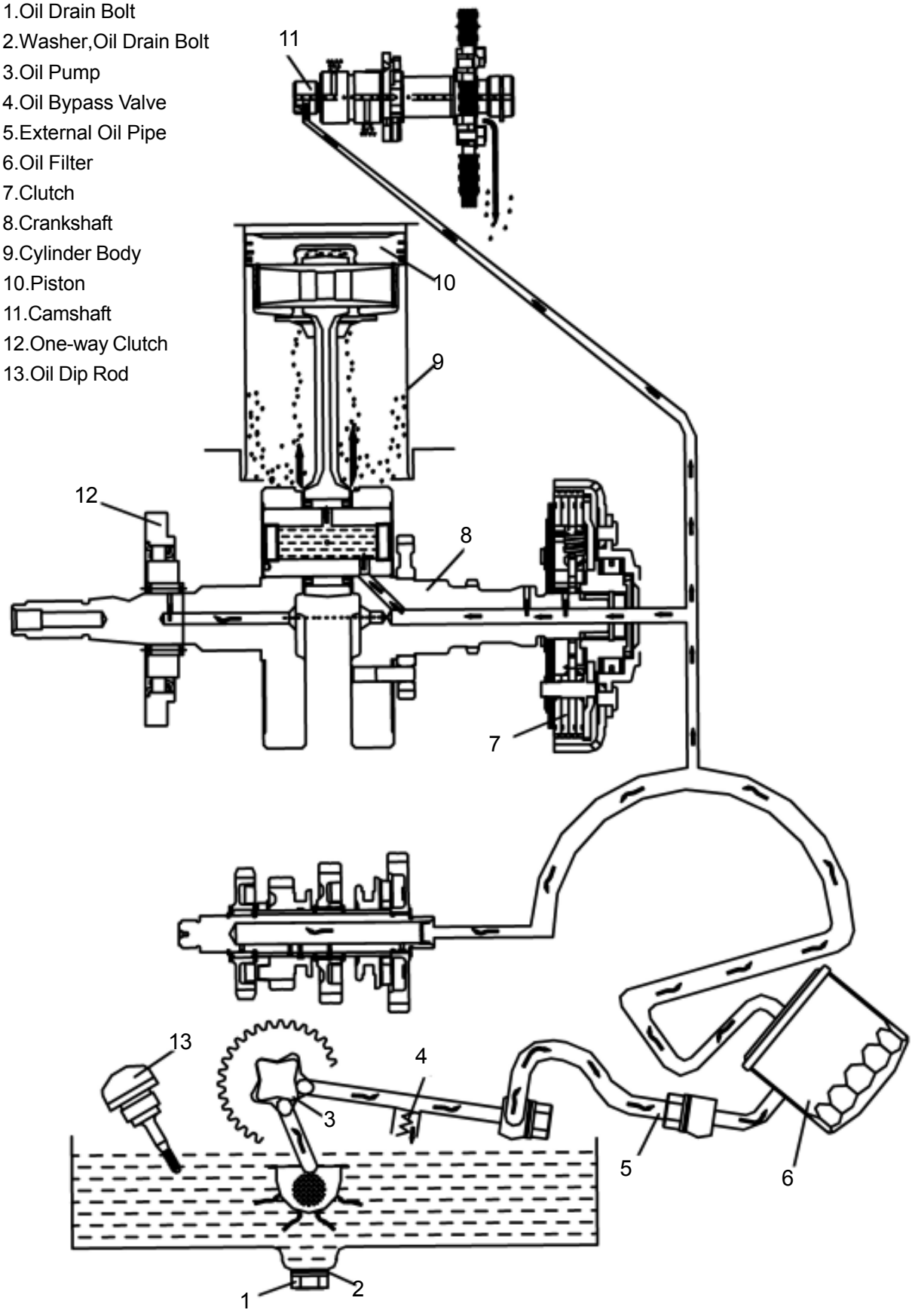


Illustration of CF188 Engine Lubrication System

1.Oil Drain Bolt
2.Washer,Oil Drain Bolt
3.Oil Pump
4.Oil Bypass Valve
5.External Oil Pipe
6.Oil Filter
7.Clutch
8.Crankshaft
9.Cylinder Body
10.Piston
11.Camshaft
12.One-way Clutch
13.Oil Dip Rod



Add oil to the engine parts(piston,cylinder body,camshaft and so on) which run at high speed
Engine lubrication should be special oil. Engine oil is not only used as lubrication, but also used to wash, rustproof,seal and cool.

Inspection of Lubrication system (→ 3-22)

Inspection of engine oil pump and limit pressure valve (→ 6-41)

Overhaul Info

Operation Cautions

•Securely support the ATV with bracket when removing or installing engine.Take care not to damage frame, engine body,bolts and cables.

•Wrap the frame to avoid anyy possible damage when removing or installing the engine.

•Following operation doesn't require removal of engine from the vehicle:

Oil pump

Throttle body, air filter

Cylinder head cover, cylinder head, cylinder body, camshaft

CVT system, CVT cover

Gearbox

Right side cover, AC magneto, water pump

Piston, piston ring, piston pin

Following operation require removal of engine from vehicle:

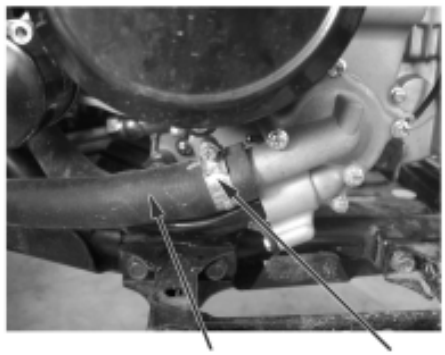
Crankshaft

Tightening Torque:

Engine front upper mounting bolt:	35N～45**N • m**
Engine front rear mounting bolt:	40～50**N • m**
Bolt, engine front rear mounting bracket:	35～45**N • m**
Bolt, engine front upper mounting bracket:	35～45**N • m**

Engine Removal

Remove:
—Plastic(-Chapter 2)
—Air Filter(-Engine service chapter)
—Throttle body (-Engine service chapter)
—Clamp
—Water Inlet Hose



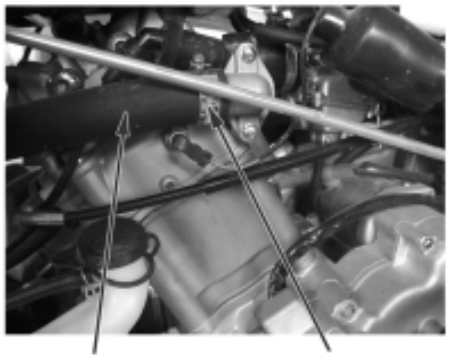
Remove screw.

Remove gearshift rod .

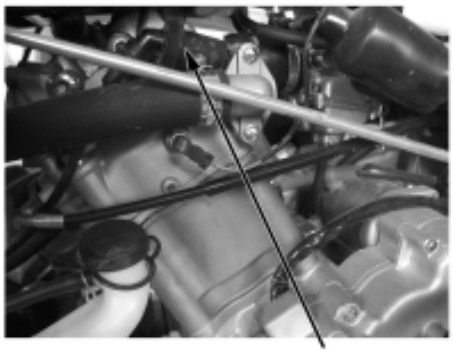
Remove clamp

Remove water outlet hose

Remove Wiring Sleeve.
Remove connectors of magneto, enriching device lead, pickup, water temperature transducer, gear sensor as illustrated on the right.



Remove spark plug cap from spark plug.

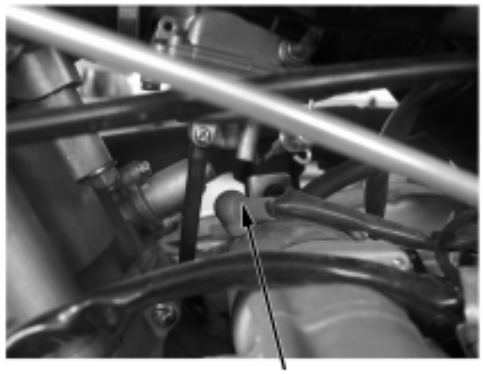


Spark Plug Cap

Remove protection sleeve of starter relay.

Remove Nut.

Disconnect positive cable of starter relay.



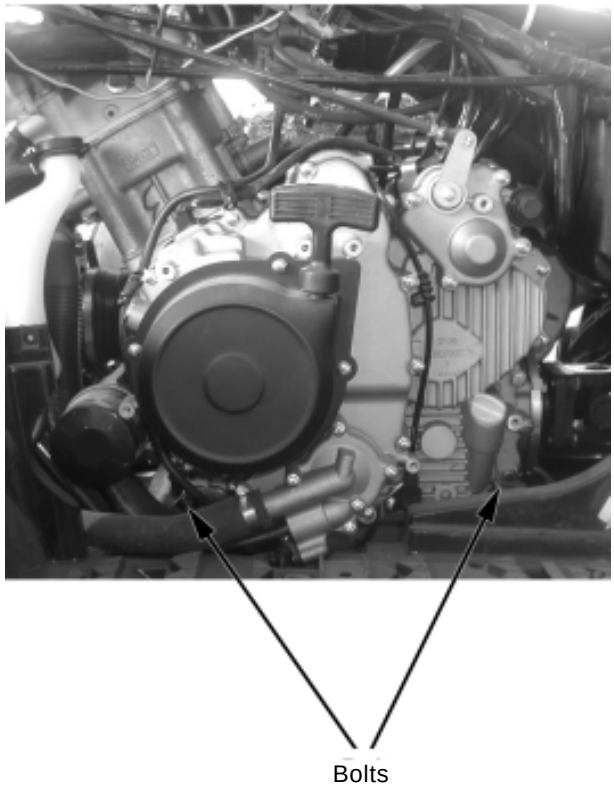
Positive Cable,Starter Motor

Remove nut.

Remove negative cable of starter relay.

Negative Cable,Starter Motor

Remove engine mounting bolts 4 locations.



Engine Installation

Put engine onto the frame,install the two lower mounting bolts and nuts

Tightening torque:

Engine lower hanger bolt:50-60N • m

Install:

—Water outlet and inlet hoses to engine with proper clamps.

—Positive and negative starting wires to engine.

—Connect all the connectors.

—Spark plug cap.

—Gearshift rod to engine.

—Air filter, throttle body and removed parts.

Removal and Installation of Front and Rear Axle

Support the vehicle with jack,stands, make sure the vehicle will not fall.

Remove:

Plastic parts for frame(→Chapter 2)

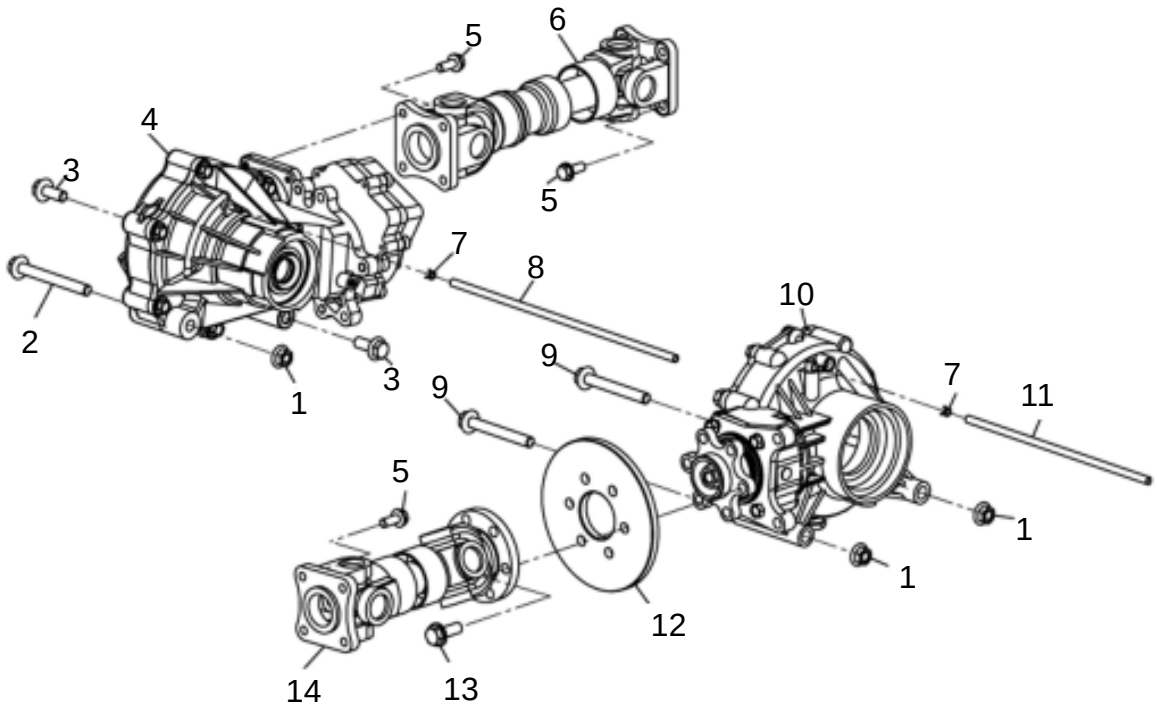
Front and rear wheels and arms (→Chapter 8)

Air filter(Chapter 7)

Carburetor(Chapter 7)

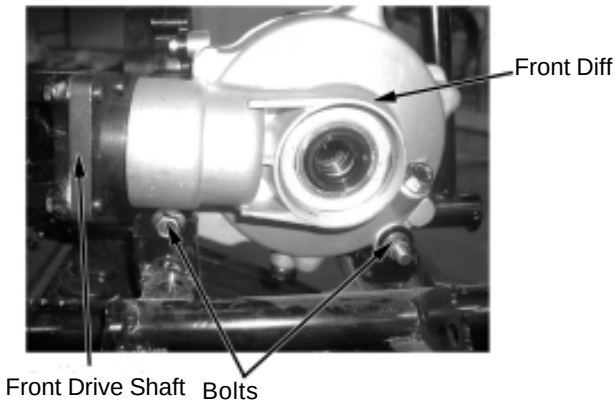
Engine

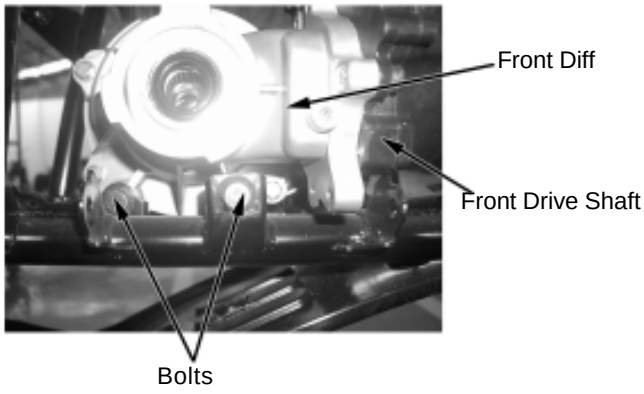
Rear brake Caliper（→ Chapter 7）



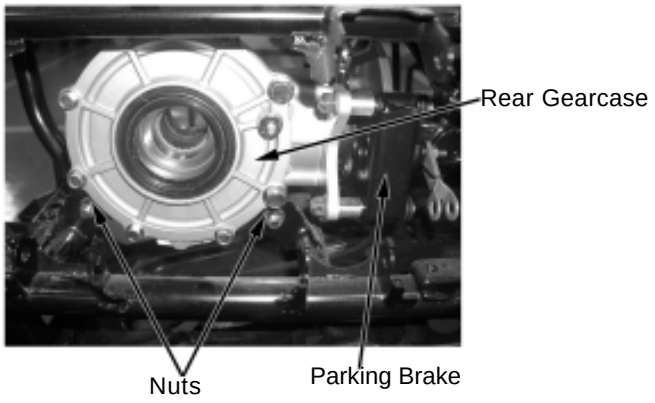
1.Nut 2.Bolt1 3.bOLT2 4.Front Diff 5.Bolt3 6.Front Drive Shaft 7.Clamp
8.Breather Hose 9.Bolt4 10.Rear Gearcase 11.Breather Hose,Rear Gearcase
12.Rear Brake Disc 13.Bolt5 14.Rear Drive Shaft

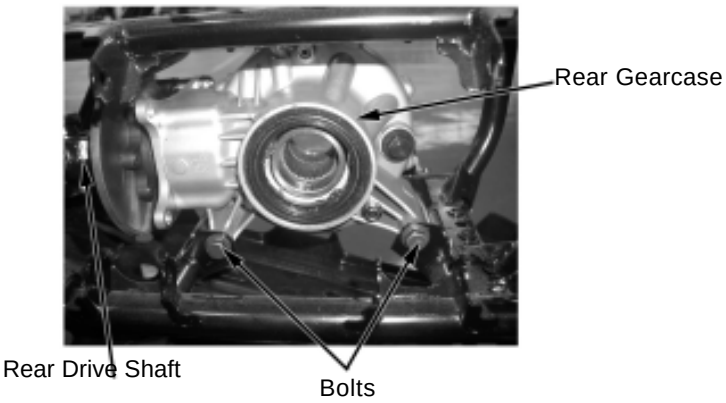
Remove nut and bolt of front axle from frame.



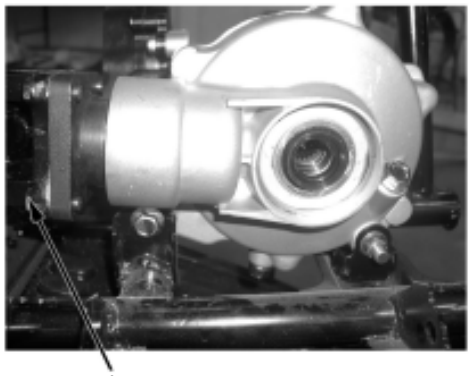


Remove nut and bolt of rear axle from frame.





Remove the 18 bolts for drive shafts and front and rear axles(Refer to 5,bolt 3)
Remove
Front and rear axles,drive shafts,rear brake disc.



Installation

Reverse the removal procedure for Installation
Tightening torque:

Bolt,front axle:40-50N • m

Bolt,rear axle:40-50N • m

Bolt,front and rear drive shafts:40-50N • m

5

Gearshift Unit

Remove

left and right side panel (→2-6)
Fuel tank top cover(→2-8)
Front fender(→2-8)
Bolt 1
Gearshift rod

Remove the 3 bolts
Remove gearshift unit

Installation:

Reverse the removal procedure for installation
Make sure that gearshift is flexible.

In case of any inflexibility,adjust the gearshift rod to ensure the gear engagement.

6 Engine Removal, Inspection and Installation

△Engine Removal/Installation Orders and the Relative Page Numbers

Item	DES	Disassembly	Inspection / Maintenance	Assembly	Remarks
Engine Periphery	Water Hose/Pipe	3-2	2-11	3-69	
	Left Side Cover	3-2	———	3-69	
	Recoil Starter	3-2	3-49	3-68	
Engine Front Side ↓	Spark Plug	3-2	2-4	3-68	
	Cylinder Head Cover	3-3	3-14	3-66	
	Tensioner	3-3	3-24	3-67	
	Camshaft	3-3	3-21	3-65	
	Cylinder Head/Tensioner Plate	3-4	3-15/3-23	3-64	
	Cylinder/Timing Chain Guide	3-4	3-24/3-23	3-64	
	Piston	3-5	3-25	3-62	
Engine Left side ↓	Starting Motor	3-5	6-3	3-62	
	Oil Filter	3-6	2-9	3-62	
	Sector Gear	3-6	———	3-61	
	Water Pump	3-7	5-7	3-61	
	Sheave Drum	3-7	3-48	3-60	
	Left Crankcase Cover/ Magneto Stator	3-7	3-48	3-60	
	Magneto Rotor	3-7	3-47	3-60	
	Starting Driven Gear	3-8	3-47	3-59	
	Starting Dual Gear/Idle Gear	3-8	3-48	3-59	
	Oil Pump Sprocket and Chain	3-8	———	3-59	
Engine right side ↓	CVT Cover	3-9	3-51	3-58	
	Drive Belt	3-9	3-36	3-57	
	Primary Sheave/Secondary Sheave	3-9	3-30	3-57	
	CVT Housing/Clutch Outer Face	3-10	3-51	3-57	
	Clutch	3-10	3-28	3-56	
	Timing Chain	3-10	3-23	3-56	
Engine Center ↓	Gear Position Bolt	3-11	———	3-56	
	Right Crankcase	3-11	3-52	3-56	
	Front Output Shaft Components	3-11	3-43	3-55	
	Driven Bevel Gear Components	3-11	3-43	3-55	
	Shift Cam	3-12	3-40	3-55	
	Guide Bar, Fork	3-12	3-39	3-55	
	Drive Bevel Gear Components	3-12	3-42	3-55	
	Main Transmission Shaft	3-12	3-38	3-54	
	Transmission Counter Shaft	3-12	3-38	3-54	
	Balancer Shaft	3-12	3-46	3-54	
	Crankshaft	3-13	3-27	3-54	
	Oil Pump, Pressure-limiting Valve	3-13	3-41	3-53	
	Left Crankcase		3-52		

Notes: Arrowhead direction is for engine removal orders. Reverse the direction for assembly and installation.

Ⅰ Engine Removal

△Preparation before engine removal

●Prepare a proper tray used for load of components.

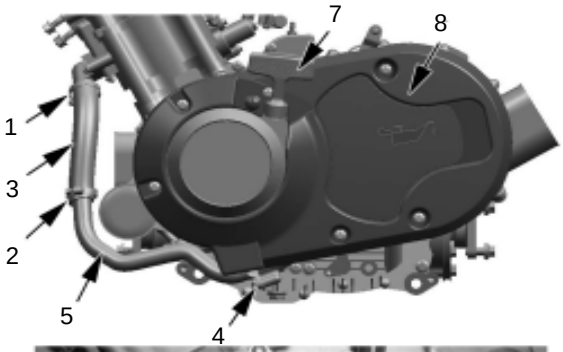
●Prepare necessary removal and assembly tools.

● Drain engine oil (3-22).

●Drain coolant (3-15).

△ **Engine Periphery**

Water Hose/Pipe



●Remove water hose clamp 1,2,Remove water hose 3.

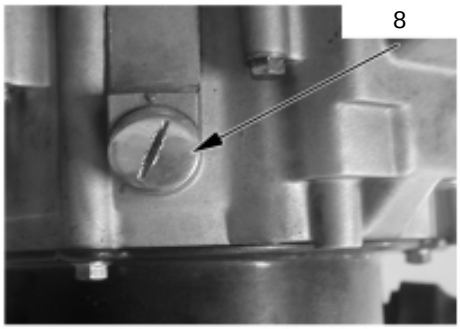
●Remove screw 4 and water hose 5.

Left Side Cover

●Remove 6 bolts(M6×20)of left side cover 6 (M6×20), Remove left side cover 6.

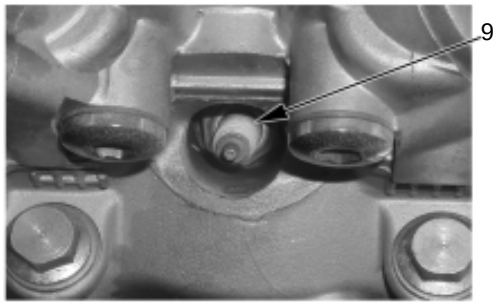
Recoil Starter

●Remove 4 bolts(M6×12)of recoil starter Remove recoil starter7.



Inspection Plug

●Remove inspection plug 8 with screwdriver.



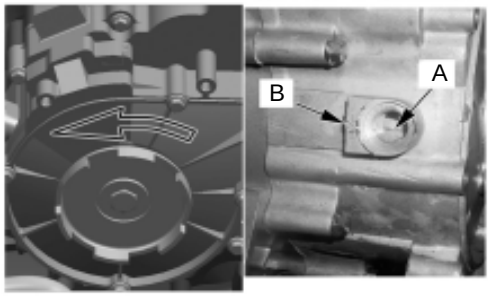
△ **Engine Front Side**

Spark Plug

●Remove spark plug 9 with special wrench.

Tool: Spark Plug Wrench

●Turn crankshaft, align T.D.C. line A on magneto rotor with mark B of left crankcase (piston on T.D.C).



Cylinder Head Cover

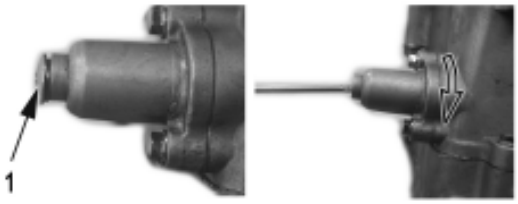
●Remove valve adjusting covers.

●Remove12 bolts of cylinder head cover.

●Remove cylinder head cover.

Timing Chain Tensioner

●Remove screw plug 1, insert a flat screwdriver intoslot of timing chain tensioner adjuster , turn itclockwise to lock tensioner spring.



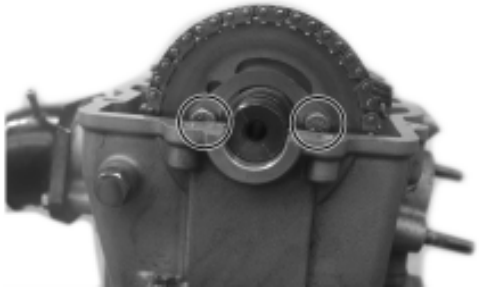
● Remove tensioner bolts.

●Remove tensioner and gasket.

Camshaft

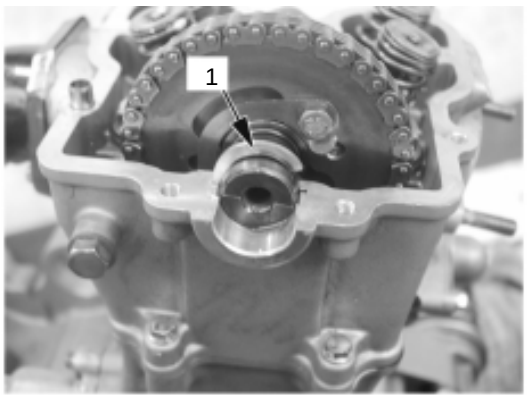
●Loosen timing sprocket bolt.

●Remove timing sprocket bolt and lock.



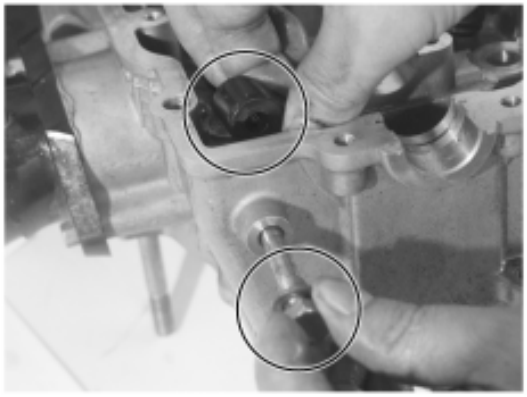
●Remove C-ring 1.

●Remove timing sprocket from camshaft, remove camshaft.



NOTE: Take care not to drop spacer, bolt, bolt lock and C-ring into crankcase.

●Remove cam chain guide.

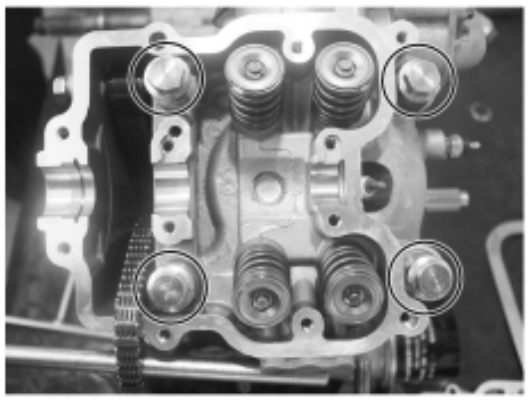


Cylinder Head

●Remove cylinder head bolts.

●Remove cylinder head bolts diagonally.

●Remove cylinder head.



NOTE: Take care not to drop dowel pin into crankcase

Cylinder

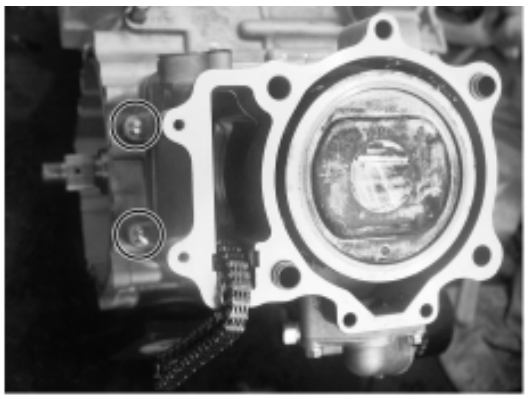
●Remove dowel pin and cylinder head gasket.

●Remove timing chain guide 1.

●Remove cylinder bolt.

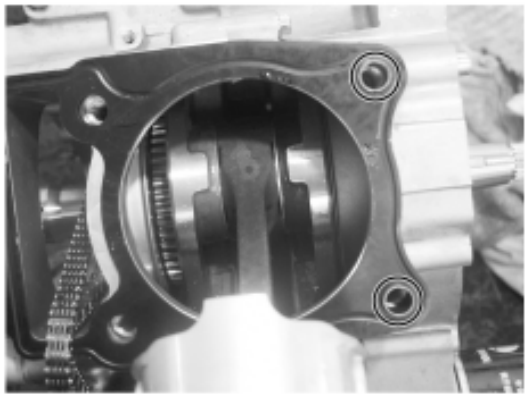
● Remove cylinder.

NOTE: Take care not to drop dowel pin into crankcase



●Remove dowel pin and cylinder gasket.

NOTE: When performing above removal process,be sure to hook up timing chain to prevent it from falling into crankcase.



Piston

●Remove piston pin circlip 1with long nosed pliers.

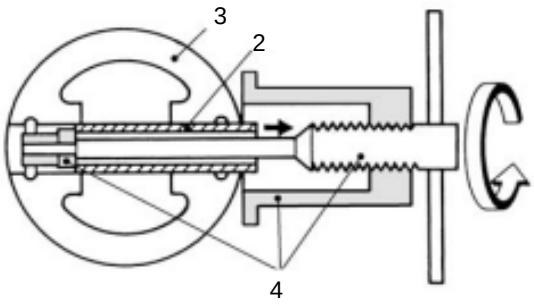
NOTE: Put a clean rag under piston so as not to drop piston pin circlip into crankcase

●Remove piston pin 2 and piston 3.

NOTE:

● When installing piston, make sure its identification conforms to that of cylinder.

● When removing piston pin, clean off burrs of piston pin hole and groove. If it is difficult to remove the piston, DO NOT hammer, use a special remover 4



Tool: Piston Pin Remover

△ Engine Left Side

Starting Motor

●Remove 2 bolts of starting motor.

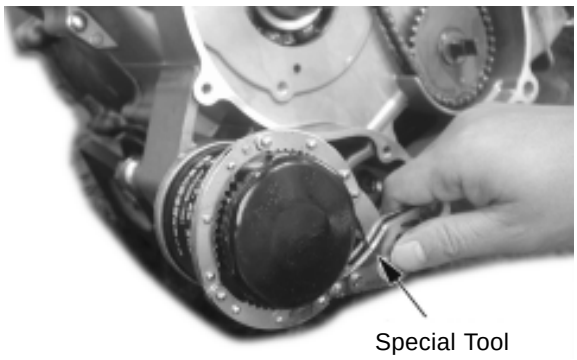
●Remove starting motor.

Starter Motor

Oil Filter

●Remove oil filter with special tools.

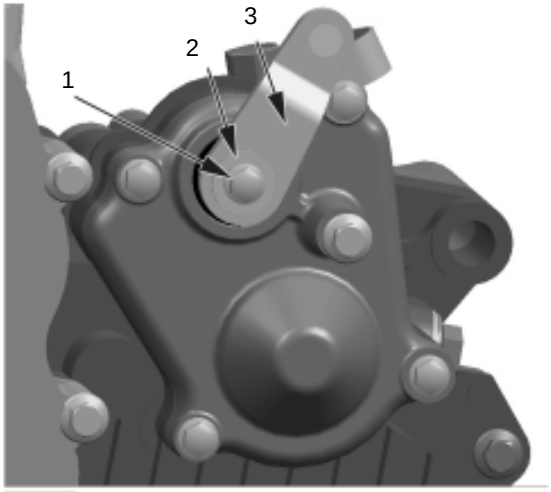
Tool: Oil filter Remover



Sector Gear

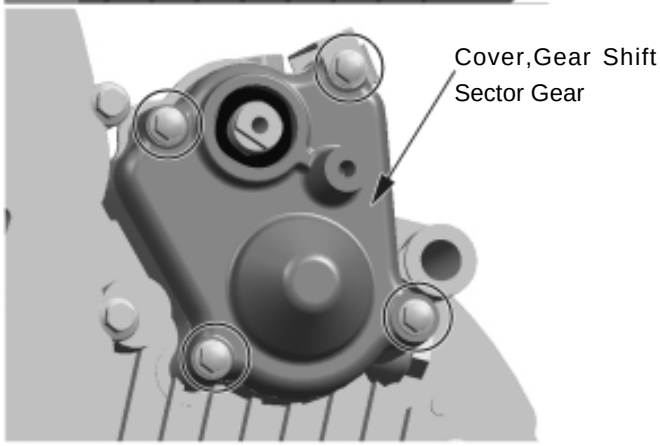
●Remove bolt 1 of gearshift rocker arm.

●Remove gasket 2 and gearshift rocker arm 3.



●Remove bolt of sector gear housing cover.

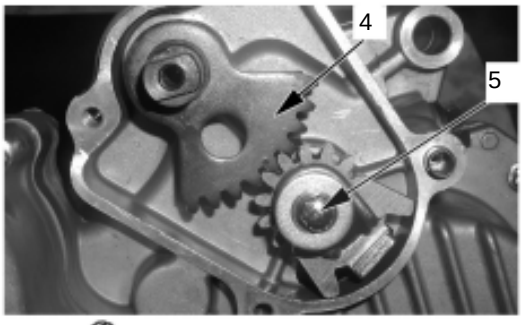
●Remove wire clip and sector gear housing cover.



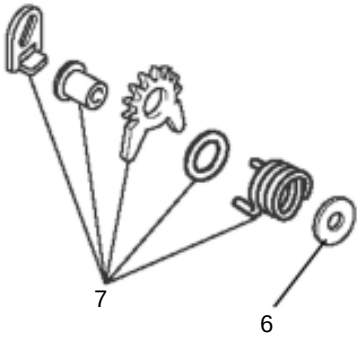
●Remove dowel pin and gasket.

●Remove drive sector gear 4.

●Remove bolt 5 of driven sector gear.

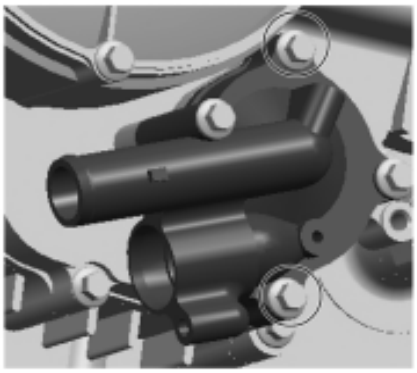


●Remove washer 6 and driven sector 7.



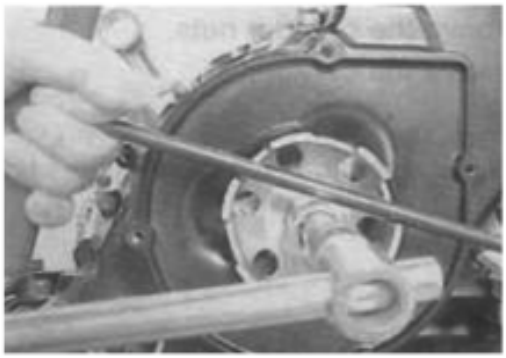
Water Pump

- Remove water pump screws.
- Remove water pump.



Sheave Drum

- Remove the sheave drum by using a suitable bar.
- Remove washer and sheave drum.

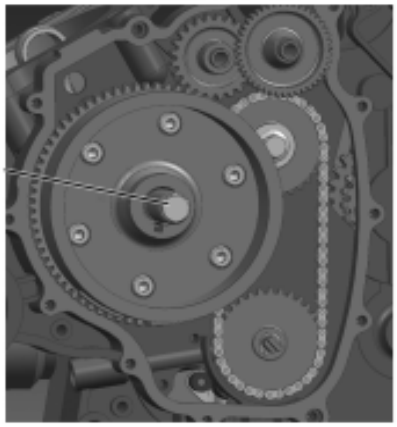


Left Crankcase Cover

- Remove bolts.
- Remove left crankcase cover.
- Remove dowel pin and gasket.

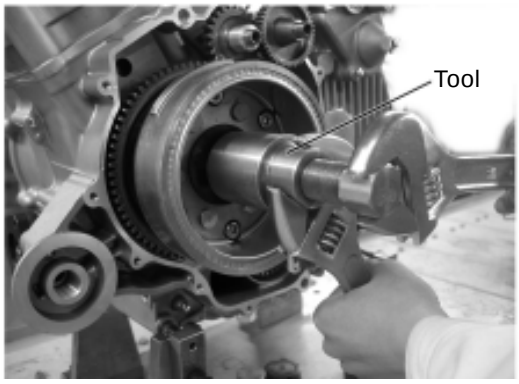
Magneto Rotor

- Install attachment 1 to crankshaft end.



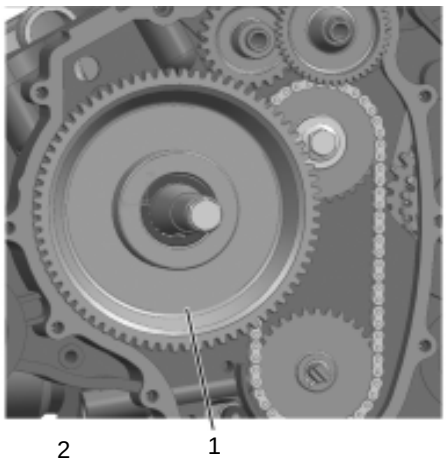
- Install special tool to rotor thread; Remove rotor and woodruff key.

Tool: Rotor Remover



Starting Motor Gear

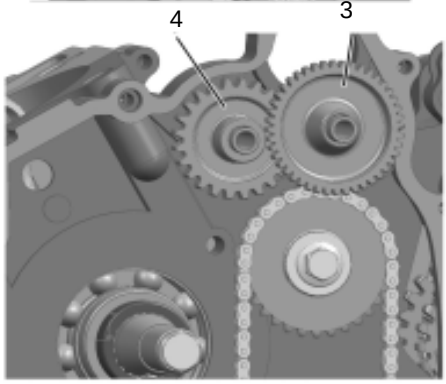
● Remove driven gear 1 and needle bearing.



● Remove spacer 2.

● Remove dual gear and shaft 3.

● Remove idle gear and shaft 4.

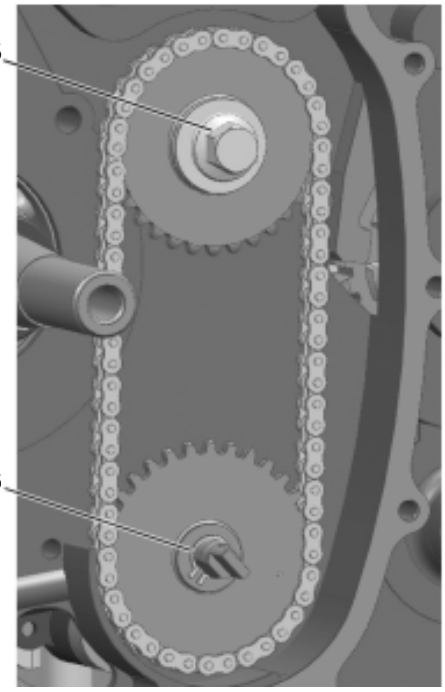


Oil Pump Sprocket and Chain

● Remove drive sprocket nut 5.

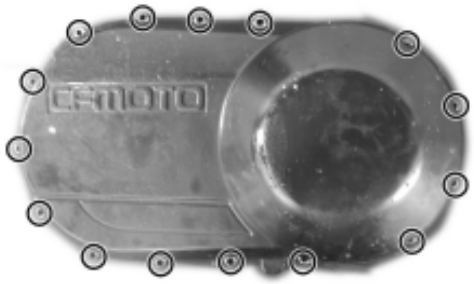
● Remove C-ring 6.

● Remove oil pump drive and driven sprockets and chain.



△ Engine Right Side

CVT Cover

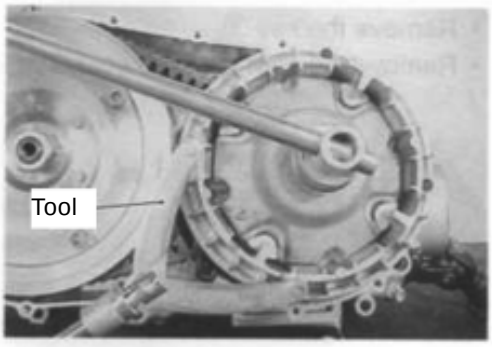


●Remove bolts from CVT cover.

●Remove CVT cover.

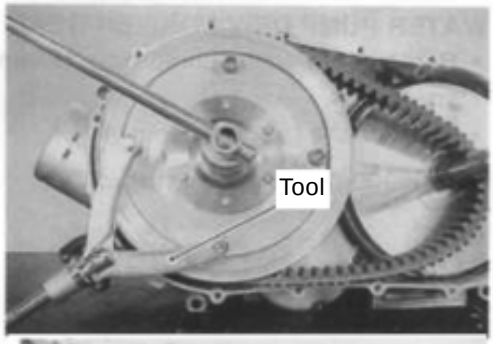
●Remove gasket and dowel pin.

CVT(Continuously Variable Transmission)



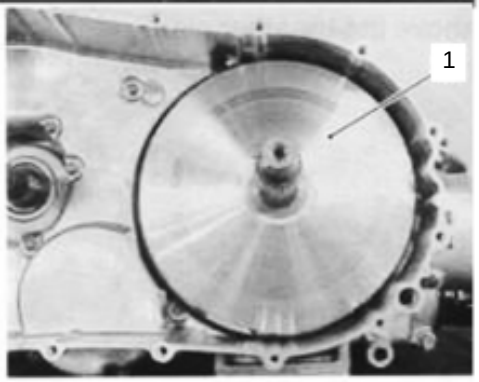
●Remove primary sheave nut with special tool.

●Remove primary sliding sheave.



●Remove secondary sheave nut with special tools.

●Remove secondary sheave.



●Remove drive belt.

Tool: Sheave Holder

●Remove primary fixed sheave 1.

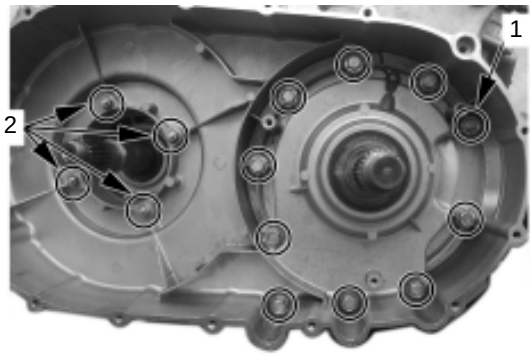
●Remove bolts for air guide plate,Remove air guide plate.

CVT Case

●Remove bolts #1 from CVT case.

●Remove nuts #2 from CVT case.

●Remove outer clutch face and CVT case.



●Remove dowel pin, front and rear gasket.

Clutch

●Remove clutch shoe fixing nut with special tool.

●Remove clutch shoe.

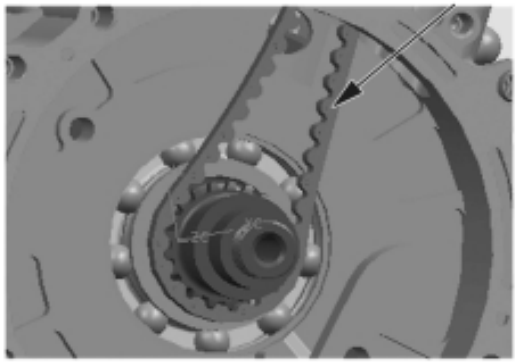
NOTE: The clutch shoe nut has left-hand threads

Tool

Timing Chain

●Remove timing chain.

Timing Chain

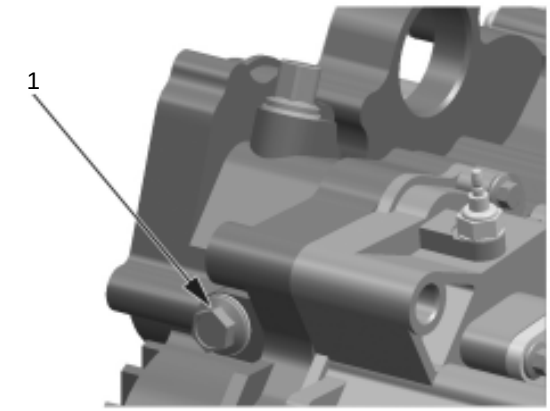


△ Engine Center

Gear position bolt

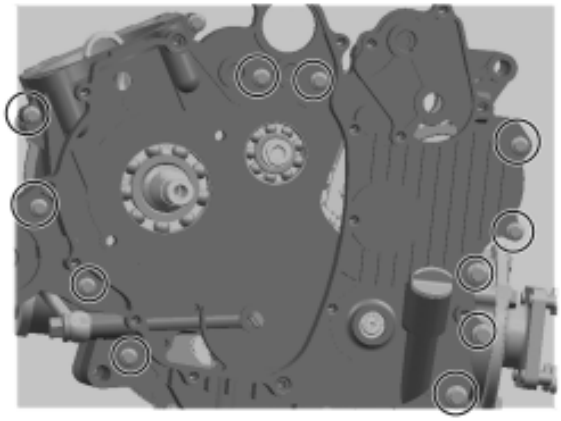
●Remove gear position bolt 1.

●Remove spring and steel ball.

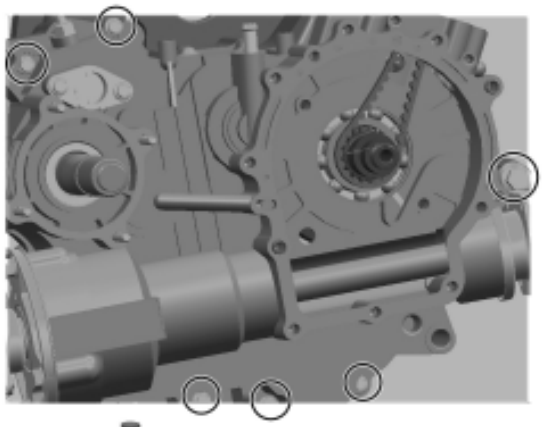


Right Crankcase

●Remove left crankcase bolts.



●Remove right crankcase bolts.

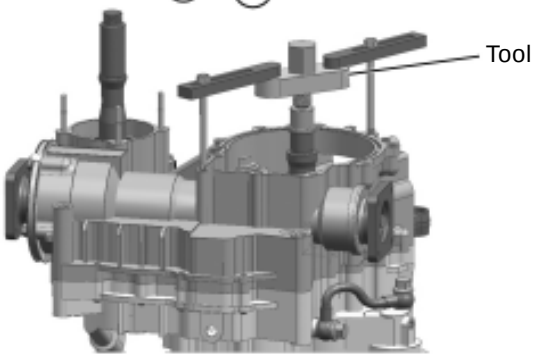


●Separate right crankcase with special tool.

CAUTION:

●The Crankcase separator plate should be parallel with the end face of crankcase.

●Crankshaft should remain in the left crankcase half.



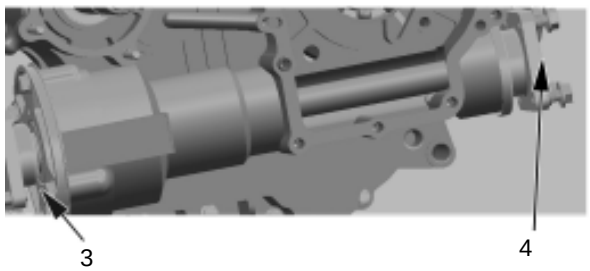
Tool: Crankcase separator

Driven Bevel Gear, Front Output Shaft

●Remove bevel gear cover bolt.

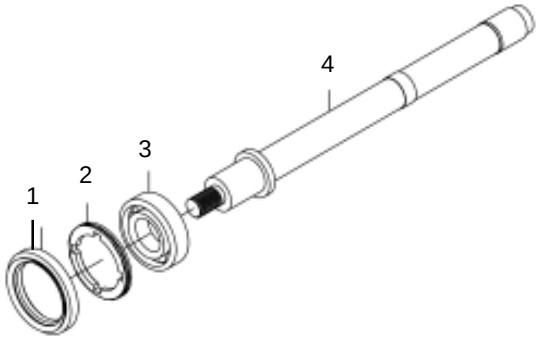
●Remove driven bevel gear 3.

●Remove front output shaft nut 4.



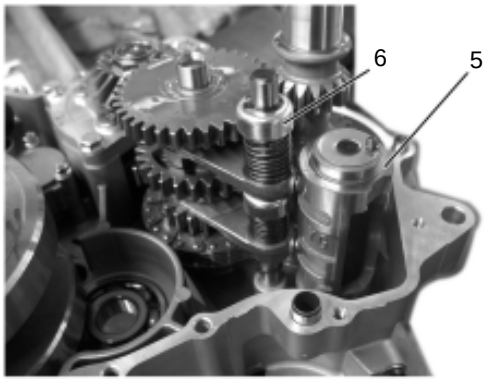
●Remove Oil seal 1,Bearing limit nut 2(left roll).

●Remove Front Output Shaft 4 .



Shift Cam, Fork/Shaft

●Remove Shift Cam5, Fork /Shaft 6.

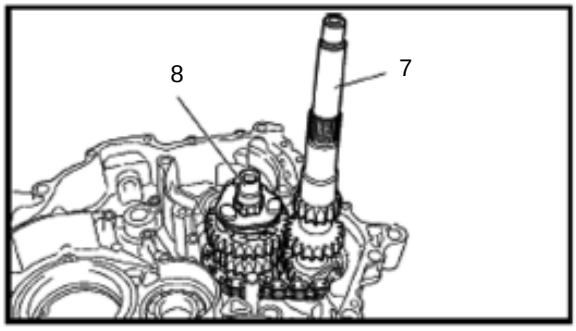


Drive Bevel Gear

●Remove left crankcase from driven bevel gear.

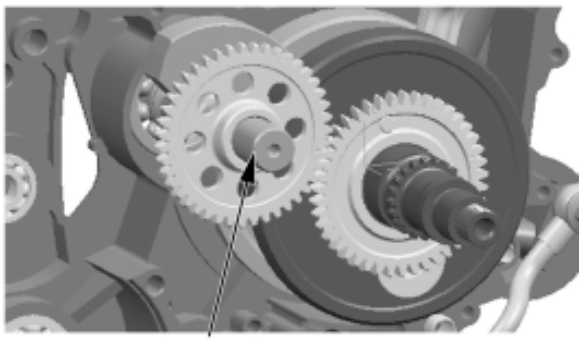
Drive Shaft, Drive Shaft

●Remove drive shaft 7and driven shaft 8.



Balancer Shaft

●Remove balancer shaft.

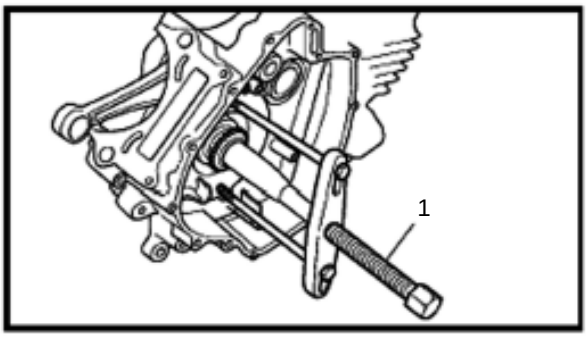


Balance Shaft

Crankshaft

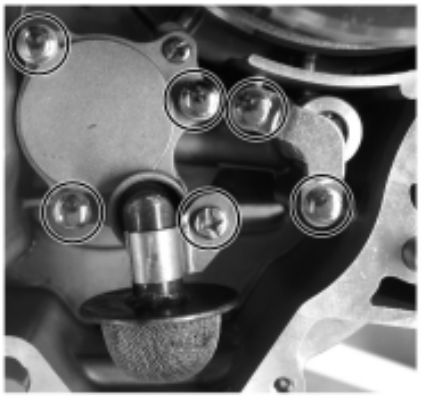
●Separate crankshaft from left crankcase with special tool.

Tool: Crankshaft Separator



Oil pump, Relief Valve

●Remove oil pump and relief valve.



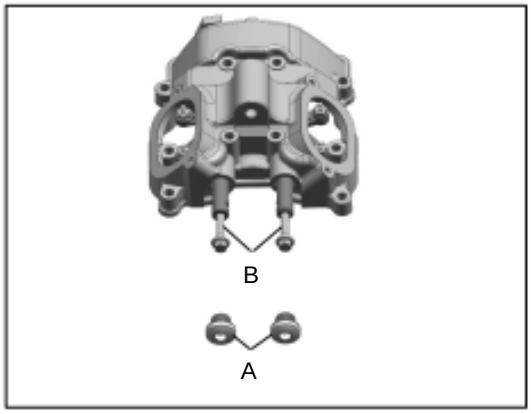
Ⅱ Engine Components Inspection

Cylinder Head Cover

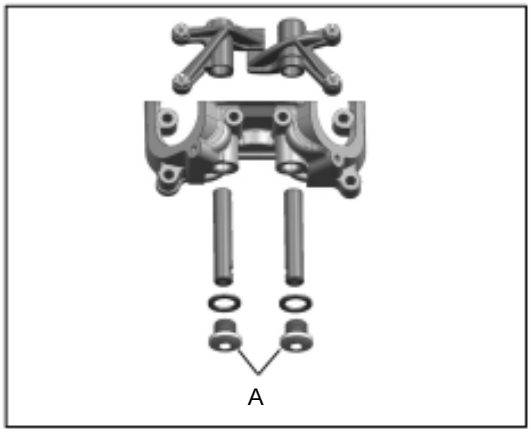
△Disassembly

CAUTION: Each removed part should be identi fied to its location, and the parts should be laid out in groups designated as “Exhaust”, “Intake”, so that each will be restored to the original location during assembly.

●Remove rocker arm shaft bolts A.

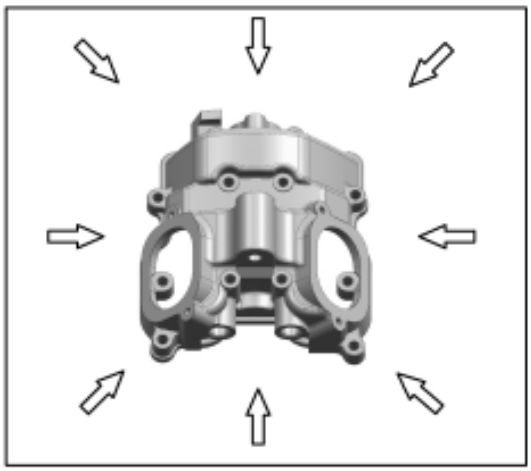


●Remove rocker arm shaft by using M6 bolts B.



Cylinder Head Cover Distortion

Clean off sealant from the fitting surface of cylinder head cover, place cylinder head cover on a surface plate and measure distortion with a thickness gauge.



Cylinder head Cover Distortion
Limit: 0.05mm

Tool: Thickness Gauge

Distortion out of range: --Replace

NOTE: Cylinder head cover and cylinder head should be replaced together.

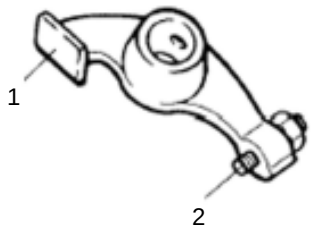
Rocker Arm Shaft

●Measure out diameter of rocker arm shaft with a micrometer.

Rocker Arm Shaft O.D.: (IN, EX)
Limit: 11.973~11.984mm
Tool: Micrometer (0~25mm)

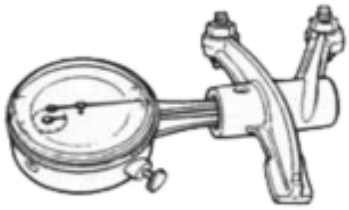
Rocker Arm

●When checking the rocker arm, check the inner diameter of the valve rocker arm and wear of the camshaft contact surface.



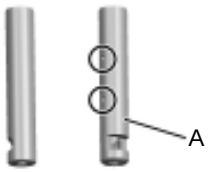
●**Rocker Arm I.D. :** .000~12.018mm

Tool: Dial Calipers



△ **Assembly**

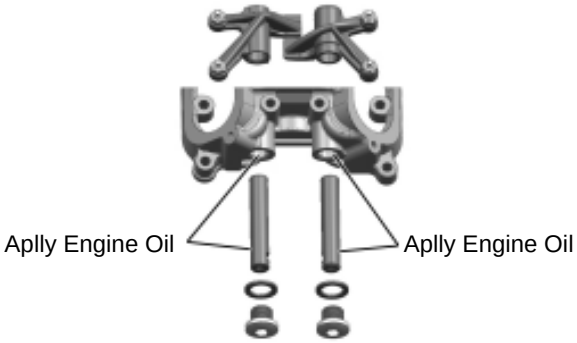
NOTE: Intake rocker arm shaft A has oil holes.



●Apply engine oil to rocker arms and shafts.

●Install rocker arms and tighten rocker arm shaft to the specified torque.

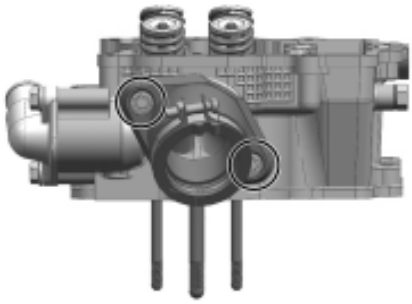
Rocker Arm Shaft Bolt: 28N.m



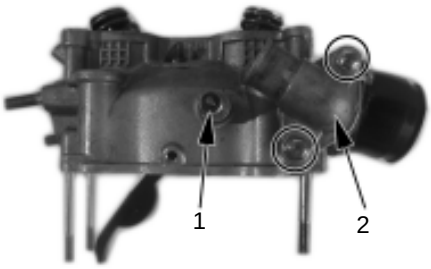
Cylinder Head

△ **Disassembly**

●Remove intake manifold.



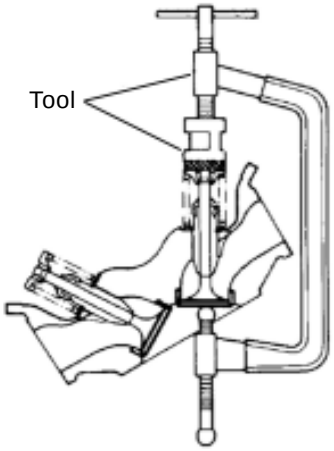
●Remove water temperature sensor 1and thermostat cover 2.



●Remove thermostat.

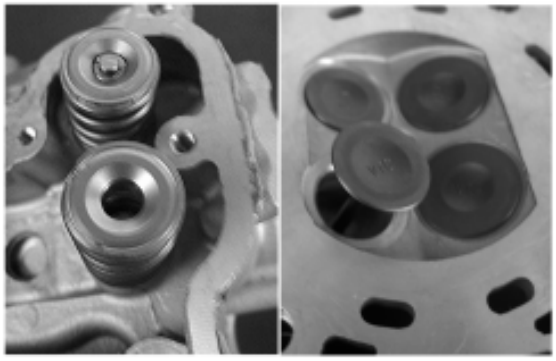
● Compress the valve spring and remove valve retainers with tweezers.

Tools: Valve Spring Compressor
Tweezers

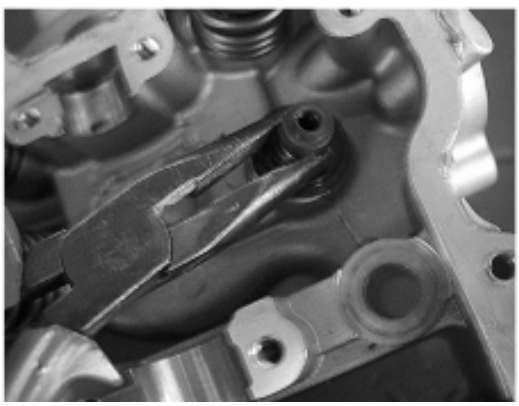


●Remove valve spring upper seat and valve spring.

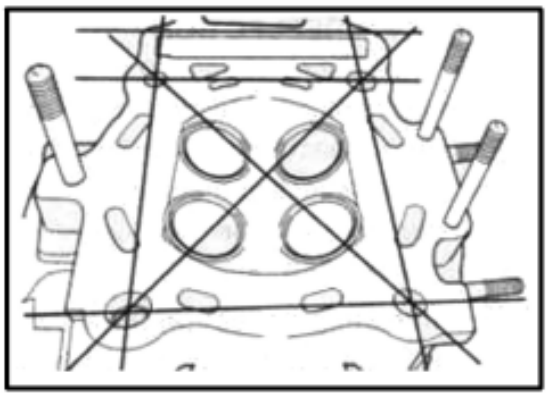
●Remove valve from the other side.



●Remove valve stem seal ring and valve lower seat.



Cylinder Head Distortion

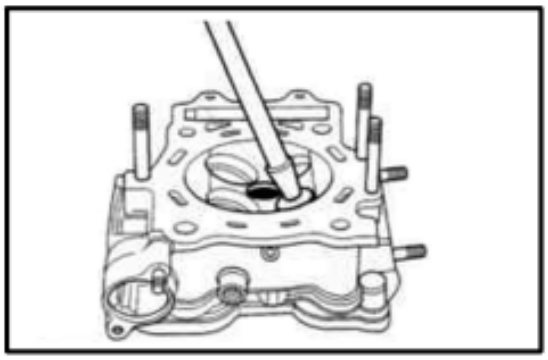


●Clean off carbon deposit from combustion chamber.

●Check the gasket surface of the cylinder head for distortion with a straightedge and thickness gauge. Take clearance readings from several places. If any clearance reading is out of the service limit, replace with a new cylinder head.

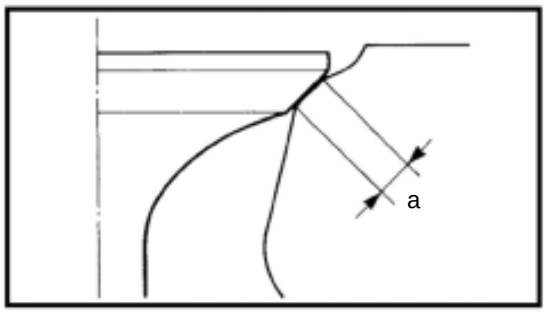
Cylinder Head Distortion Service Limit: 0.05mm

Tool: Thickness Gauge



Valve Seat Width

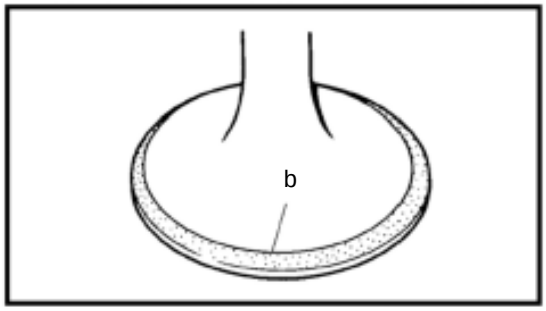
●Coat the valve seat with color uniformly. Fit the valve and tap the coated seat with the valve face in a rotating manner. To get a clear impression of the seating contact, use a valve lapper to hold the valve head.



●The ring-like dye impression on the valve face should be continuous, without any break. The width of the dye ring, which is the visualized seat width,should be within the following range:

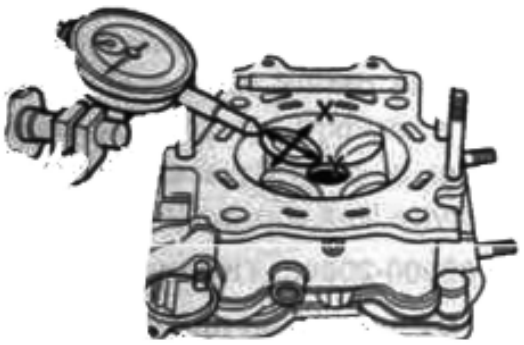
Valve Seat Width: 0.9-1.1mm

Tool: Valve Lapper



Valve Stem and Valve Guid

●Lift the valve about 10mm from valve seat. Check the valve stem deflection in the directions of X and Y perpendicular to each other, with a dial gauge. If the deflection measured is out of the limit, replace either the valve or the valve guide. (If the valve stem is worn to the limit and the clearance is found to be in excess of the limit, replace the valve. If the valve stem is within the limit, replace the valve guide.Double check the clearance after replacing the valve stem or the guide).



Valve Stem Deflection (IN & EX): 0.35mm
Tool: Micrometer
Magnetic Stand

Valve Stem O.D

●Measure valve stem O.D with a micrometer

Service Limit:

IN: 4.975-4.990mm

EX: 4.955-4.970mm

Tool: Micrometer (0-25mm)

Valve Stem Run-out

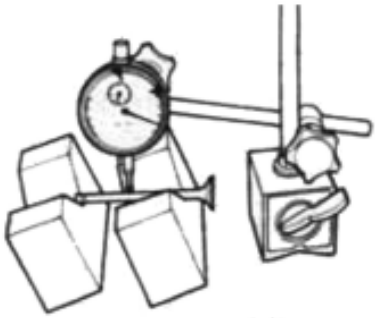
● Support valve stem with V block as illustrated on the right. Check the run-out with a dial gauge.

Service Limit: 0.05mm

Tool: Magnetism Stand

Dial Gauge (1/100)

V block



Valve Head Radial Run-out

●Measure the valve head radial run-out as illustrated on the right.

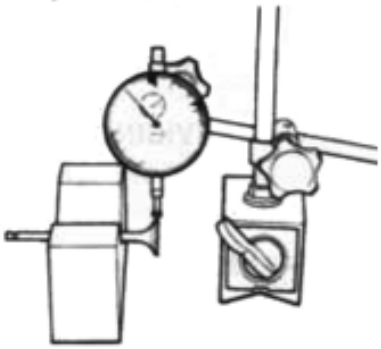
Valve head Radial Run-out out of range:--Replace

Service Limit: 0.03mm

Tool: Dial Gauge (1/100)

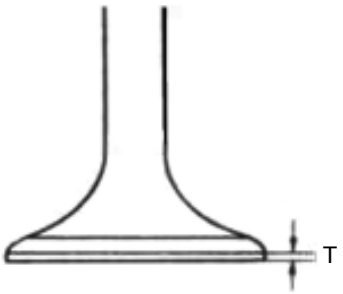
Magnetism Stand

V Block



Valve Face Wear

●Check each valve face for wear or damage. Replace valve with a new one if it is found to have abnormal wear. Measure valve head thickness T.



Valve head thickness T out of range: ---Replace

Service Limit: 0.5mm

Tool: Vernier Caliper

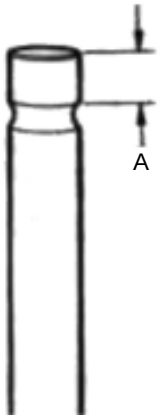
Valve Stem End

●Check valve stem end for pitting or wear. In case of any pitting or wear, resurface the valve stem end. If the length T is less than service limit, replace valve with a new one.

Valve Stem End Length

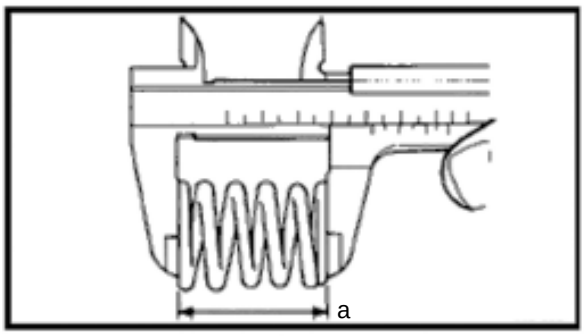
Service Limit: 2.1mm

Tool: Vernier Caliper



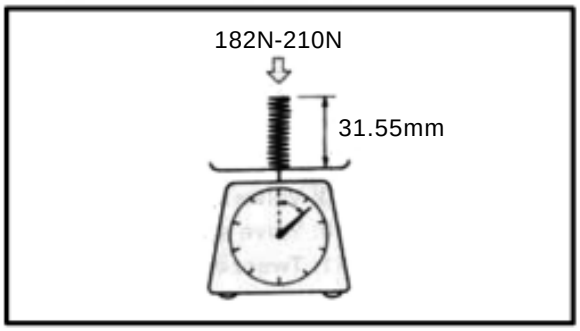
Valve Spring

Valve Spring keeps valve and valve seat tight. Weakened spring results in reduced engine power output and chattering noise from valve mechanism.



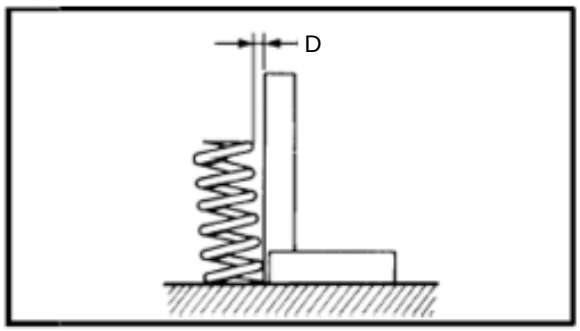
●Measure the spring free length.
Spring free length out of range: --Replace

Service Limit: 38.8mm
Tool: **Vernier Caliper.**



●Measure the force to compress the spring to the specified length.
Valve spring tension out of range: ---Replace

Service Limit: (IN/EX)
182N-210N/31.5mm
Tool: Spring Scale.



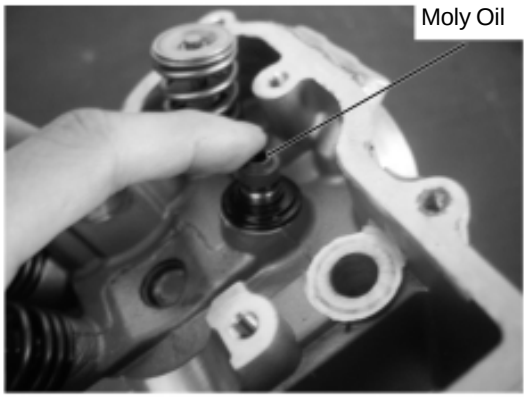
●Measure valve spring incline.
Spring incline out of range:--Replace

Valve Spring Incline Limit: 2.5o/1.7mm

△Assembly of Cylinder Head

●Install each valve spring seat;

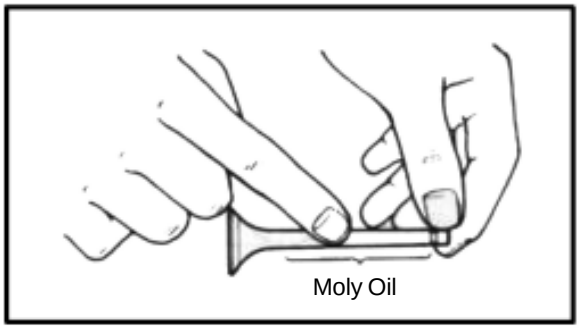
●Apply moly oil to valve stem seal and fit into position.



Material: Moly oil

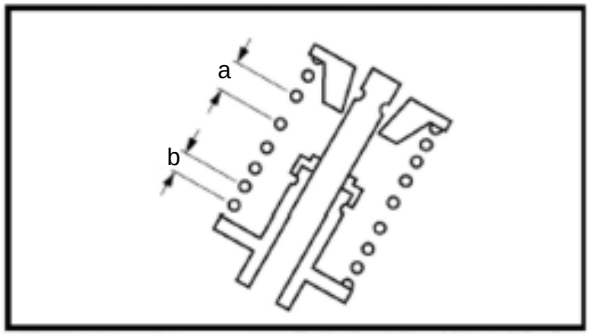
NOTE: Do not reuse the valve stem seal.

● Insert the valves, with stems coated with moly oil all around.

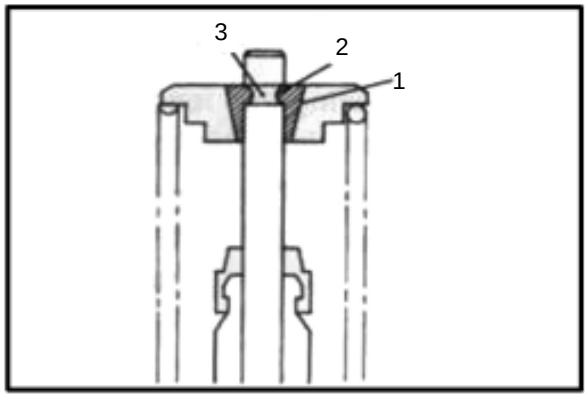


NOTE: When inserting the valve, be careful not to damage the lip of the stem seal.

●Install valve spring with small-pitch end (b) facing cylinder head. Big-pitch end (a) is marked.

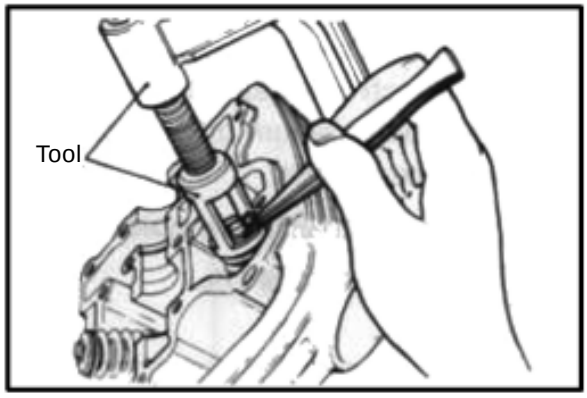


●Put on the valve spring retainer. Use the valve spring compressor to press down the spring. Fit the two cotter halves to the stem end and release compressor to allow the cotter 1to wedge in between seat and stem. Make sure that the rounded lip 2 of the cotter fits into the groove 3 in the stem end.



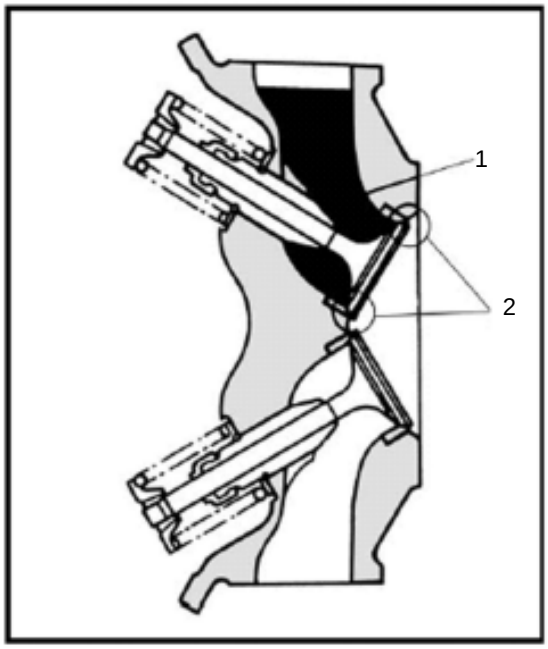
Tool: Valve Spring Compressor

Tweezers



NOTE: Knock the valve end with rubber hammer. Make sure valve cotter is fit into groove.

●Check the sealing effectiveness of cylinder head. Dip clean solution into valve IN/EX 1 and check for any leakage of valve seat 2 after a few minutes.



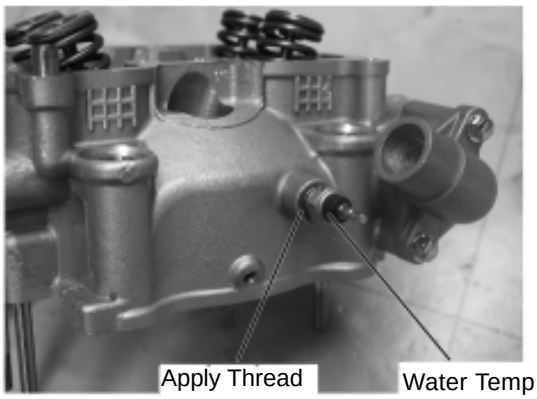
● Install thermostat.

● Install thermostat cover.

● Install water temperature sensor, apply thread locker to the thread part, tighten it to the specified torque.

Water temperature sensor

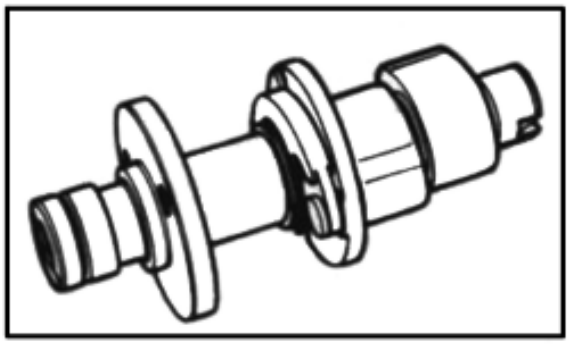
Tightening torque: 10 N.m



● Install intake pipe, apply lubricant to 0-ring.

Camshaft

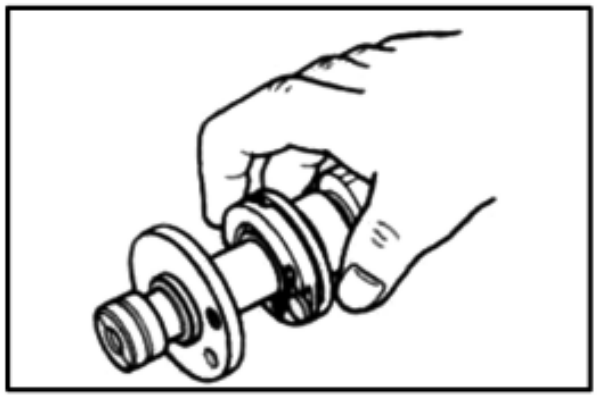
Check camshaft for wear and run-out of cams and journals if the engines produces abnormal noise or vibration or lacks power output. Any of these symptoms could be caused by wear of camshaft.



NOT E: Do not try to disassemble the camshaft/ automatic decompression assembly. It is not serviceable.

● Automatic Decompression

Move the automatic decompression weight with hand and check if it is operating smoothly. If it is not working smoothly, replace with a new camshaft/ automatic decompression assembly.

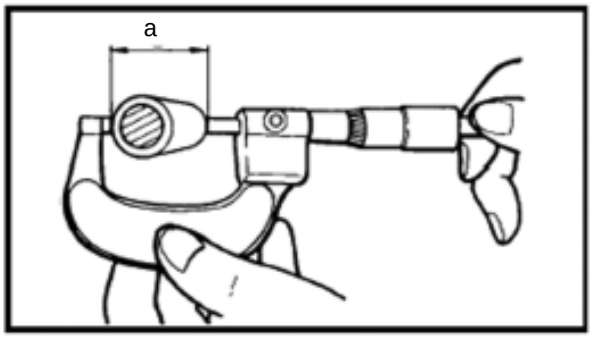


● Cam Wear

Worn cams can often cause mistimed valve operation resulting in reduced power output. The limit ofcam wear is specified for both IN and EX cams in terms of cam height¡°a¡±Measure with a micrometer the cam height.

Cam height service limit:

IN: 33.130mm
EX: 33.200mm
Tool: **micrometer (25-50mm)**



● Camshaft Journal Wear

Check whether each journal is worn to the limit by measuring camshaft journal oil clearance with the camshaft installed.

Camshaft journal oil clearance:0.15mm

Check according to the following steps:

■Clean off materials from cylinder head and cover;

■Install camshaft with plastic gauge;

■Install cylinder head cover and tighten bolts evenly and diagonally to the specified torque:

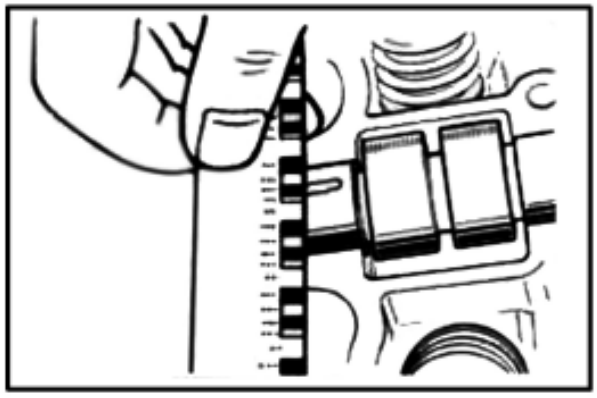
Tightening torque:10N・m

■Remove cylinder head cover, read the width of the compressed plastic gauge with envelop scale. The reading should be taken from the widest part.

Tool: Plastid Gauge

NOTE: Do not turn the camshaft with plastic gauge in place.

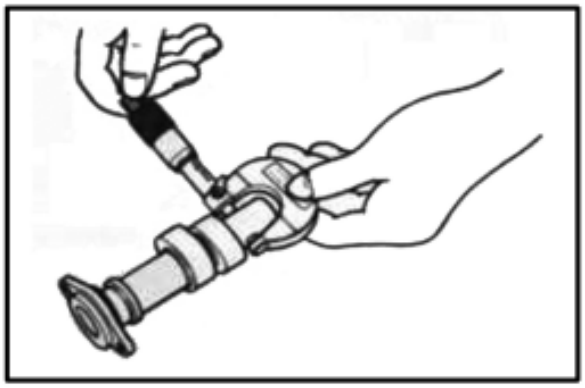
If the camshaft journal oil clearance exceeds the limit,measure the outer diameter of camshaft; Replace either cylinder head set or the camshaft if theclearance is not correct.



● Camshaft Journal O.D.

Measure camshaft journal O.D. with a micrometer. If the O.D. is out of range, replace camshaft with a new one.

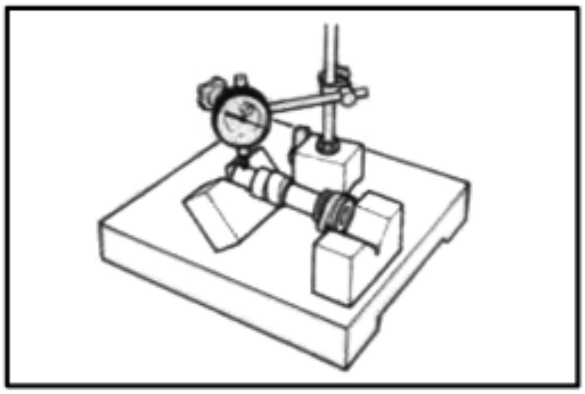
Camshaft journal O.D. service limit:
Sprocket end: 22.959 mm-21.980mm
Other end: 17.466mm-17.484mm
Tool: micrometer (0-25mm)



● Camshaft Run-out

Measure the run-out with a micrometer. Replace camshaft is the run-out is out of range.

Service limit: 0.10mm



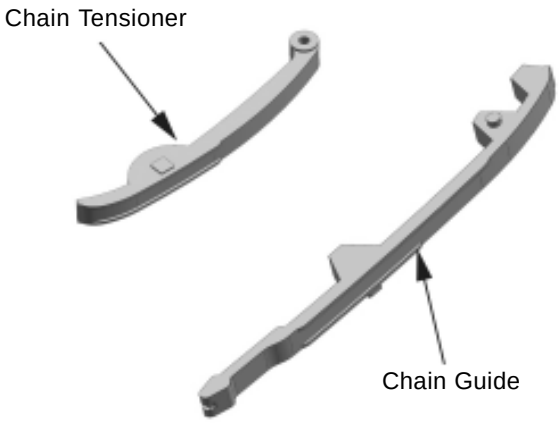
Timing Sprocket and Chain

●Check timing sprocket and chain for wear or damage.

Replace with new parts if abnormal wear or damage is found.

● Tensioner and Chain Guide

Check contact surface of tensioner and chain guide for wear and damage.
Replace with news parts if abnormal wear or damage is found.



Chain Tensioner

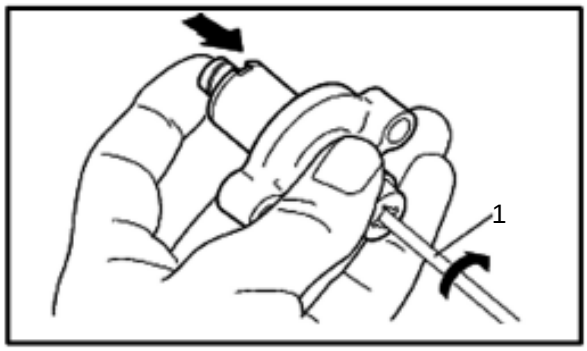
Inspection

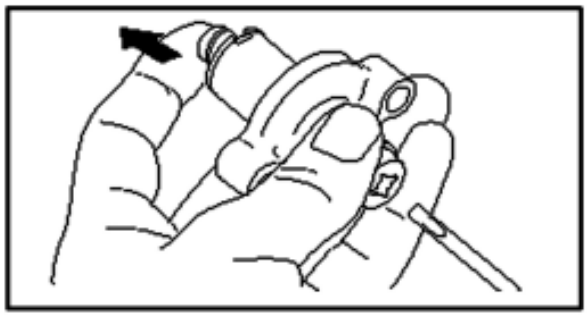
●Check tensioner for any damage or poor function.
Damage, poor function:—Replace

inspect way of working stability

■Insert screw driver 1 into the slotted end of adjusting
screw, turn it clockwise to loosen the tension and release the screwdriver.

■Check the push rod movement. If the push rod is stuck or there is a failure with spring mechanism, replace the chain tensioner with a new one.





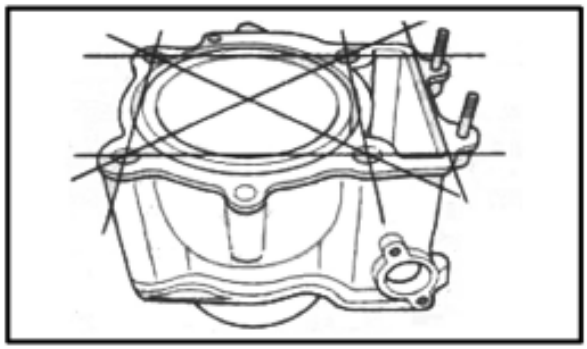
Cylinder

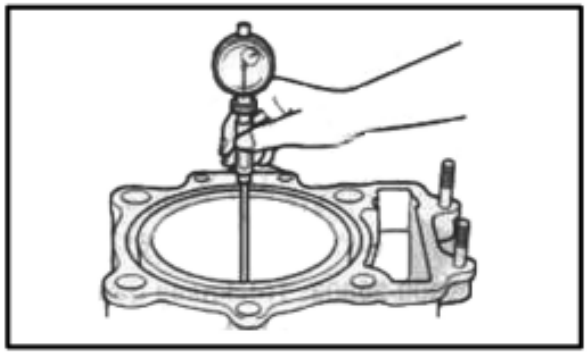
Cylinder Distortion

●Check the gasket face of cylinder for distortion with a straightedge and thickness gauge and take clearance readings at 7 points as illustrated. If the largest reading at any of the 7 points of the straightedge is out of the range,replace the cylinder.

Cylinder Distortion Service Limit: 0.05mm

Tool: Straight edge
Thickness Gauge





Cylinder Bore

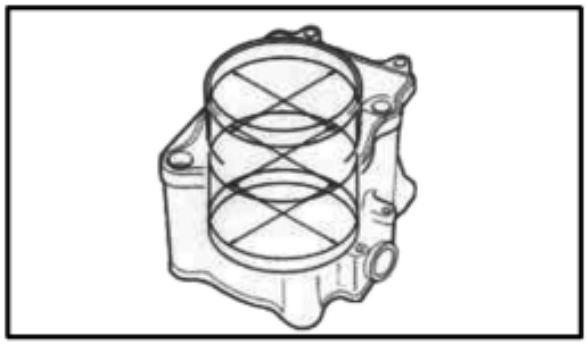
●Check cylinder wall for scratches, nicks or other damage. Replace with a new one if any

●Measure cylinder bore diameter at three points of upper, middle and lower.

Standard Cylinder Bore:

196S-B
96.018-96.038mm

Tool: Cylinder Gauge Set



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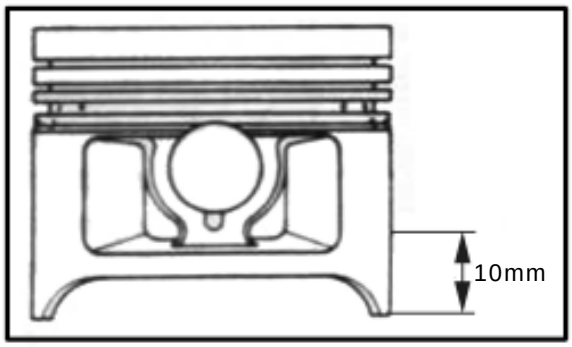
Piston

Piston Diameter

Use a micrometer to measure the diameter at the point 10mm above the piston end, as illustrated on the right. If the measurement is less that the limit, replace the piston

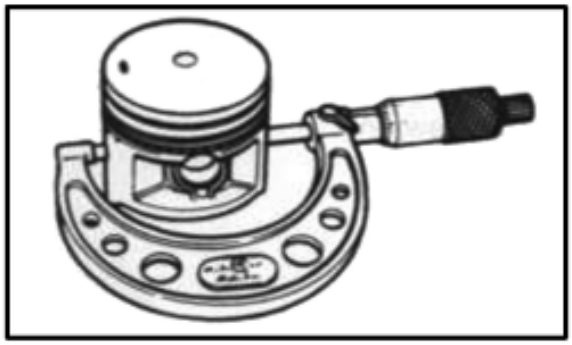


Standard:**95.960-95.980mm**

Limit:**95.880mm**

Tool:Micrometer (75-100mm)

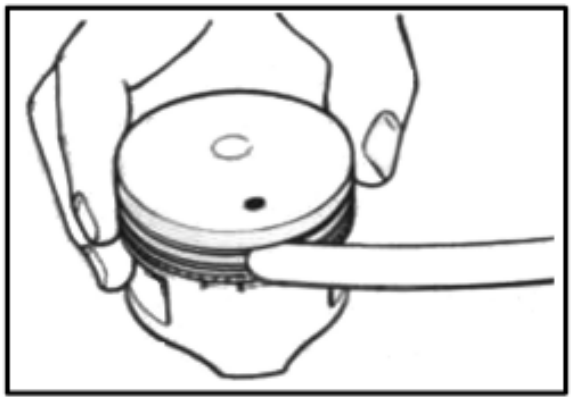
Calculate the piston to cylinder clearance according to the abovemeasurement.If the clearance is more than 0.15mm, replace the cylinder or piston, or both.



Piston Ring to Groove Clearance

Use a thickness gauge to measure the side clearance of top ring and 2nd ring.

If the clearance exceeds the limit, replace both piston and piston rings.



Service Limit:

Top ring:0.18mm

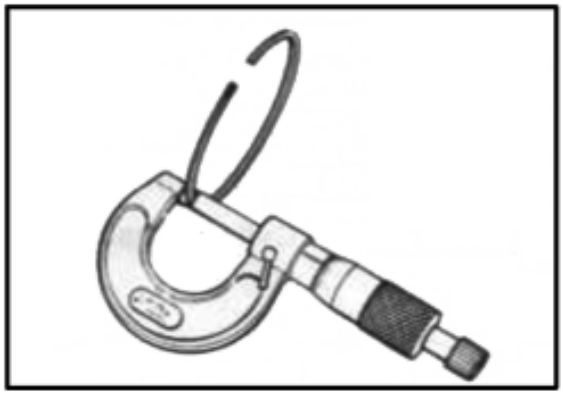
2nd ring: 0.15mm

Standard width of piston ring groove

Top ring:1.03-1.05mm

2nd ring:1.22-1.24mm

Oil ring:2.51-2.53mm



Standard thickness of piston ring

Top ring:0.970-0.990mm

2nd ring: 1.170-1.190mm

Tools: Thickness gauge

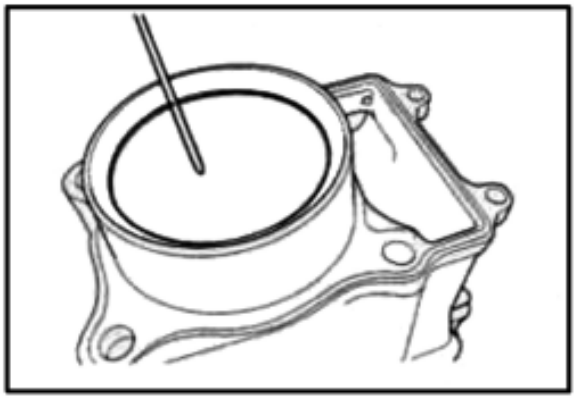
Micrometer(0-25mm)

Piston Ring Free End Gap and End Gap

Before installing piston rings, use vernier caliper to measure the free end gap of each ring, and then fit ring into the cylinder.
Use thickness gauge to measure each ring end gap, if any ring has an excess end gap, replace the piston ring

Piston ring free end gap limit:

Top ring:8.9mm
2nd ring:9.5mm



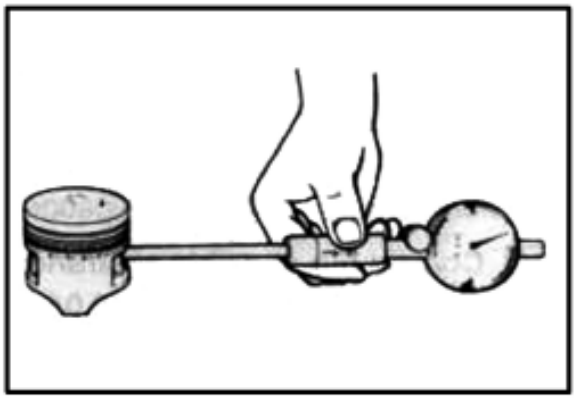
Piston ring end gap limit:

Top Ring:0.60mm
2nd ring:0.60mm

Tool: Vernier caliper

Thickness gauge

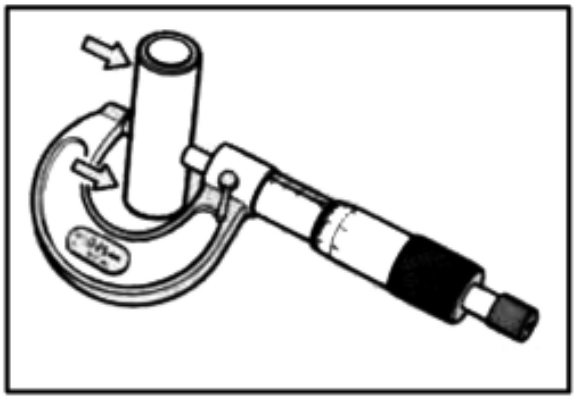
Piston Pin and Pin Bore



- Use a bore gauge to measure the inner diameter of piston pin bore.Use micrometer to measure outer diameter of piston pin.If out of limit, replace both piston and piston pin.

Piston pin bore limit: 23.030mm

- Use micrometer to measure piston pin outer diameter at three points



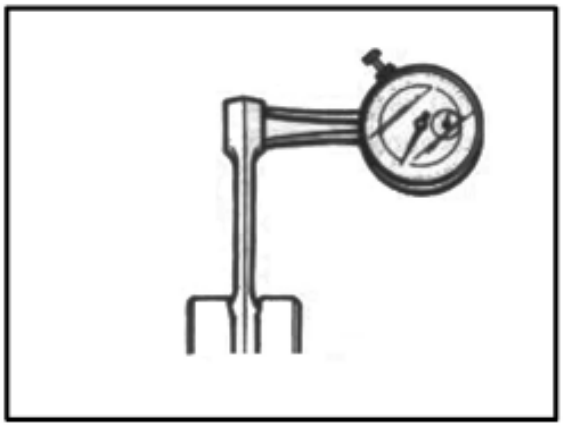
Piston pin outer diameter limit: 22.980mm

Tools: Bore gauge (18-35mm)

Micrometer (0-25mm)

ConnectingRod/Crankshaft

Connecting rod small end I.D.

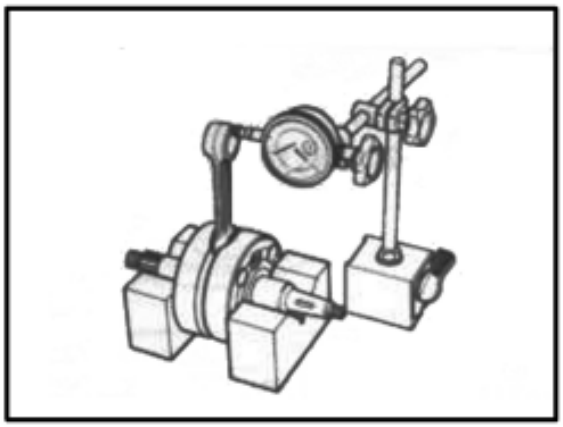


●Use a dial gauge to measure the I.D. of connecting rod small end. If the measurement exceeds the limit,replace the connecting rod.

Connecting rod small end I.D. : 23.040mm

Tool: Dial Gauge (18-35mm)

Connecting Rod Deflection

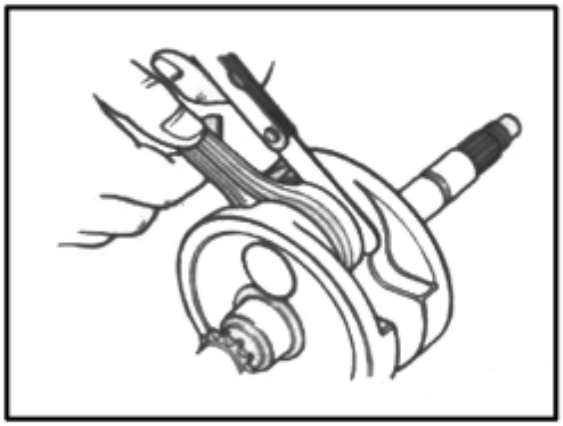


●Check the movement of the small end of the rod and inspect the wear of the small end.
Thismethod is also applicable to check and inspection of big end

Connecting Rod Deflection: 3.0mm

Tools: Dial Gauge
Magnetic stand
V-block

Connecting Rod Big End Side Clearance

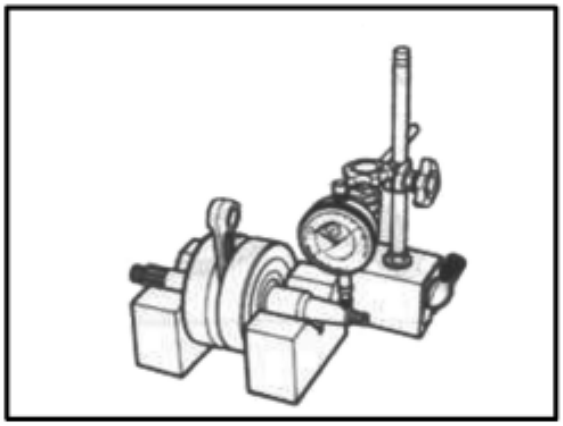


●Push the big end to one side, and use thickness gauge to measure the other side clearance.
If out of limit, replace with a new crankshaft.

Connecting Rod big end side clearance: 1.0mm

Tool: Thickness Gauge

Crankshaft Run-out



●Support crankshaft with blocks as illustrated.
Put the dial gauge, slowly turn the crankshaft and measure run-out with a dial gauge.
If the run-out exceeds the limit, correct or replace the crankshaft.

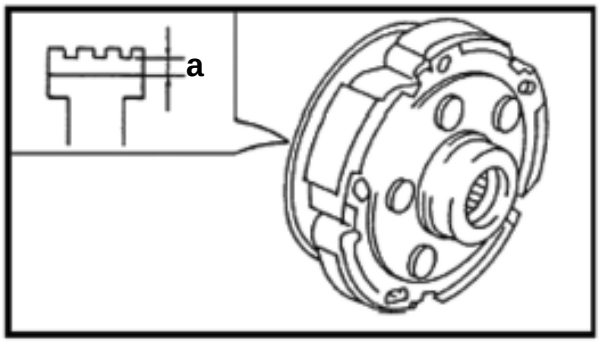
Run out limit: 0.08mm

Tools: dial gauge
Magnetic stand
V-block

Clutch Inspection

●Check clutch for chipping, scrape, uneven wear or heat discoloration. At the same time check depth of the grooves of clutch shoes. If any of the clutch shoes has no groove, replace the clutch.

NOTE: clutch should be replaced as an assembly..



Clutch Wheel

●Check the inner clutch wheel 1 for scratches, scuffs or bluediscoloration or unevenwear. If anydamageis found, replace the clutch wheel with a newone.

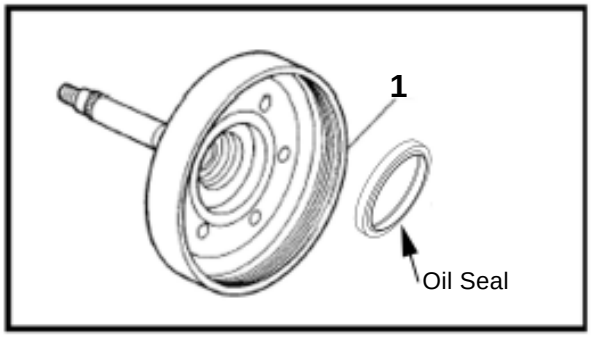
●for scratches, scuffs or blue discoloration or uneven wear. If any damage is found, replace the clutch wheel with a new one.

■Use special tool to remove oil seal

Tool: Oil seal remover

■Use special tool to assemble oil seal

Tool: Oil seal installer set



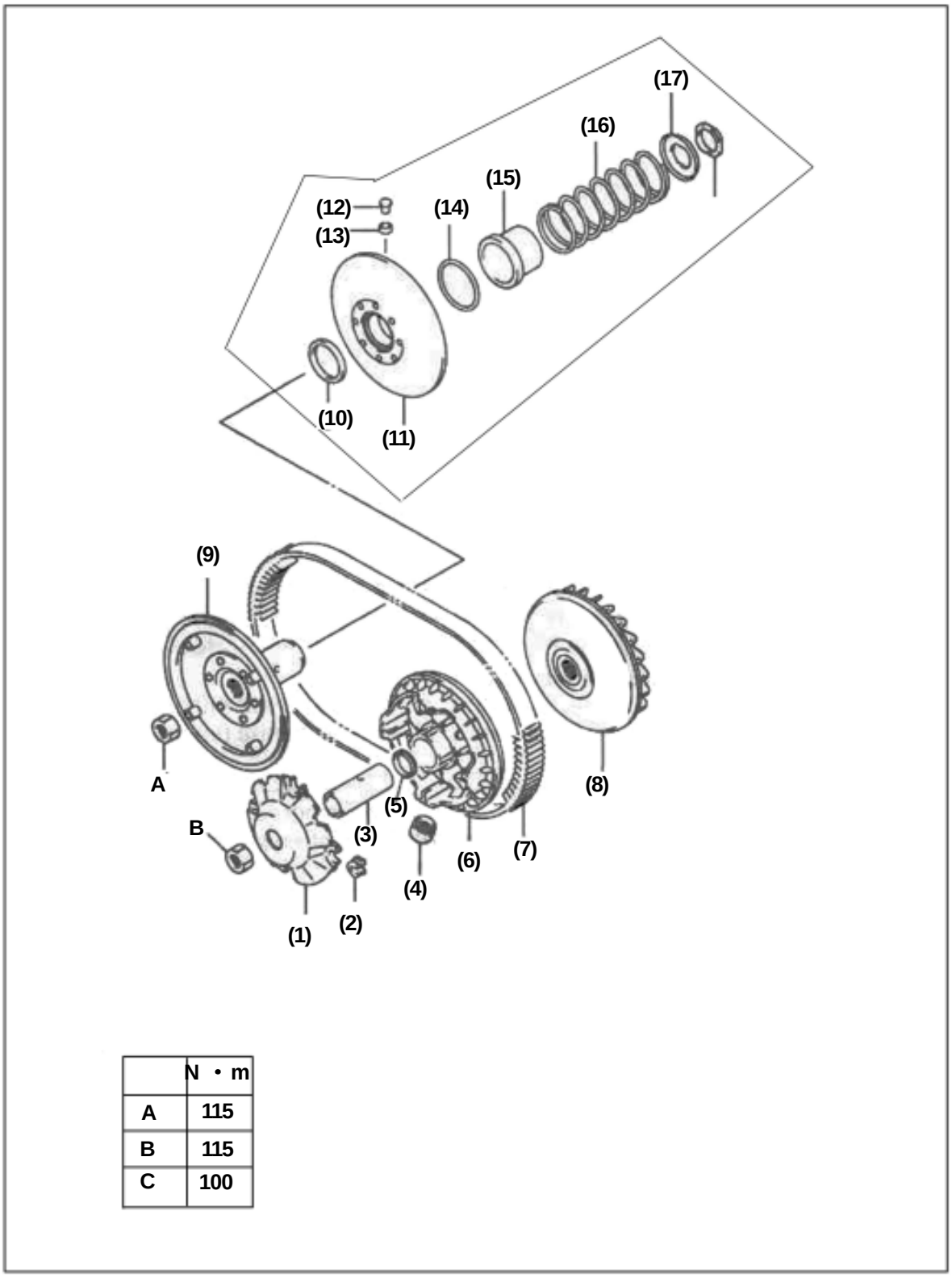
■Check the turning of bearing.

Abnormal damage: —Replace

Assembly

Apply lubricant grease to oil seal when assembling.

Primary and Secondary Sheave



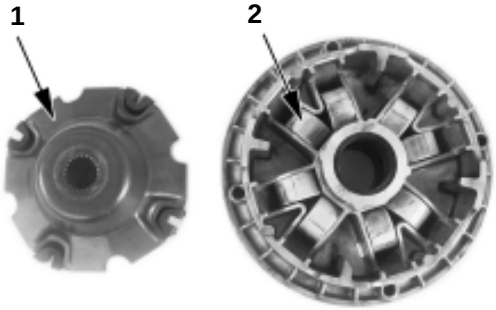
	N • m
A	115
B	115
C	100

Primary Sliding Sheave

Disassemble

● Remove spacer

●Remove Cam 1 roller 2



Roller Inspection

●Check each roller and sliding face for wear and damage.

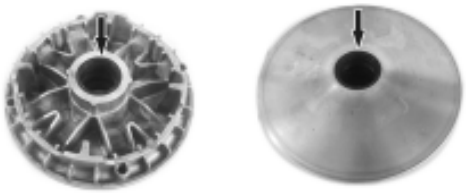
Wear and damage:—Replace

NOTE: rollers should be replaced as a set.

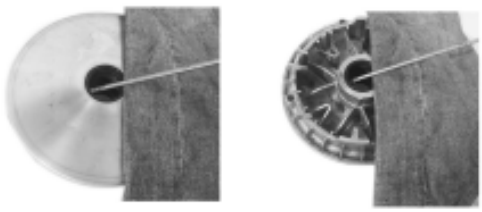
Oil Seal inspection

●Check oil seal lip for wear and damage.

Wearanddamage: —Replace

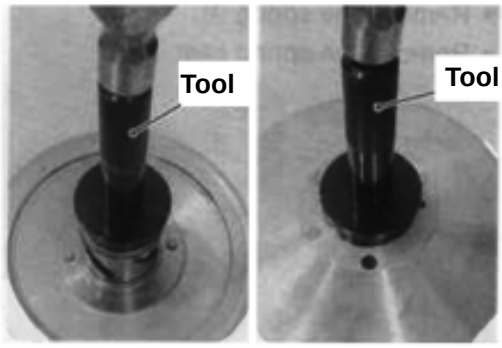


● **Remove the oil seal**



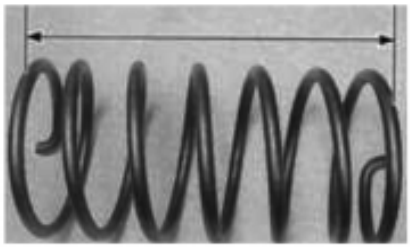
Primary Sliding Sheave and Fixed Sheave

● Check the drive face for any abnormal conditions such as damage or stepped wearing.Replace if necessary.



● Install oil seal with special tool.

Tool: Bearing install set



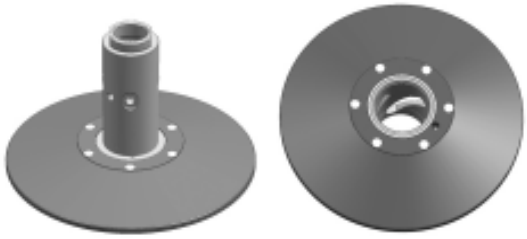
Assembly

Reverse the removal procedure of primary sliding and fixed sheave for installation.

Pay attention to the following:

● Apply grease to inner bore and oil seal lip.

NOTE:Wipe off any excessive grease thoroughly.Take care not to attach any lubricant grease to contact surface of drive belt.



Apply lubricant grease

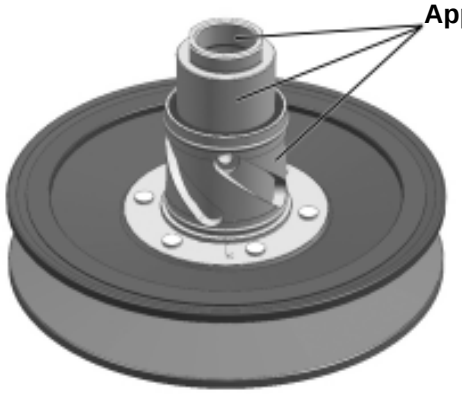
Material: Lubricant grease

● Position 8 rollers 1on the primary sliding sheave

● Install 4 dampers 2 to cam 3;

● Install cam to primary sliding sheave.

NOTE: When inserting the spacer, press down the cam so that the rollers will not come out of position.



Apply lubricant grease

● **Install Spacer**

Secondary Sheave

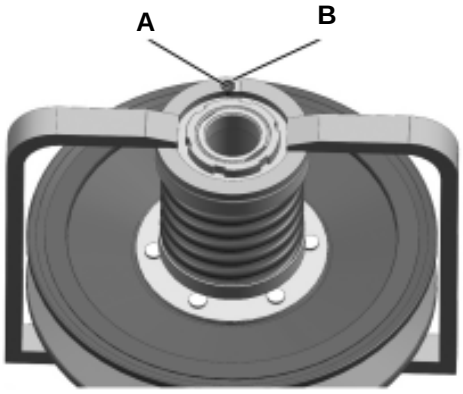
Disassembly

●Use special tool and holder to hold the secondary sheave. Remove secondary sheave nut with special tool

CAUTION: Do not remove the ring nut before attaching theclutch spring compressor.

Tool: Nut Wrench
Sheave Holder

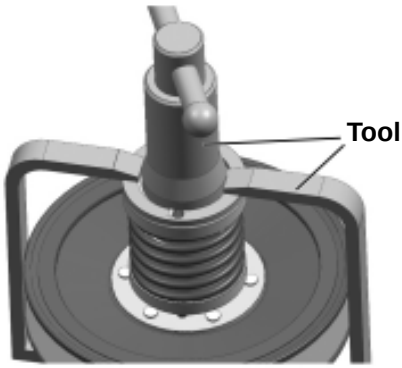
●Attach special tool to the secondary sliding sheave and compress it by turning in the tool handle.



NOTE:
Make sure that spring end A is inserted into slot B of the tool handle

●Remove ring nut.

Tool: Secondary sliding sheave spring compressor

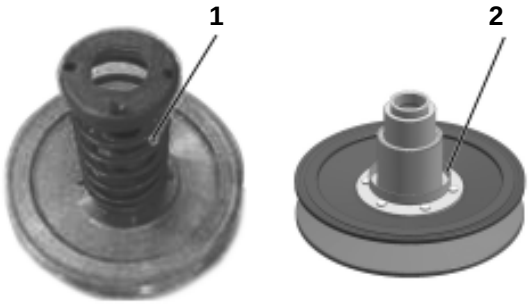


NOTE:
Since a high spring force applies to the secondary sliding sheave, take special care that the secondary sliding sheave will not come off abruptly

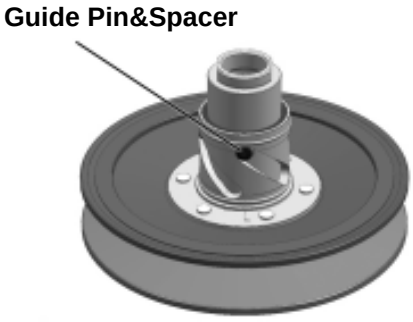
●Slowly loosen tool handle and remove the special tool.

●Remove spring 1.

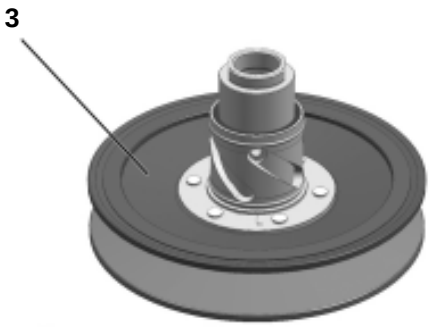
●Remove spring seat 2.



●Remove guide pin and spacer.



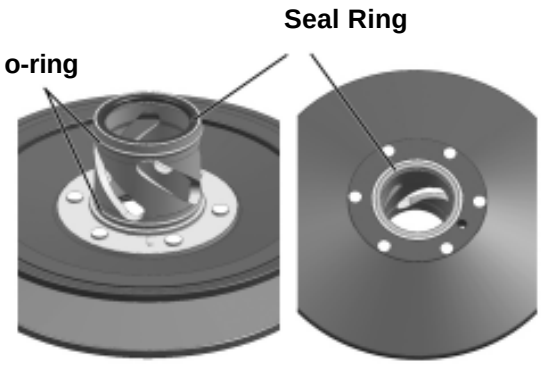
●Remove secondary sliding sheave 3.



O-ring and Oil Seal

Check the O-ring and oil seal for wear and damage.

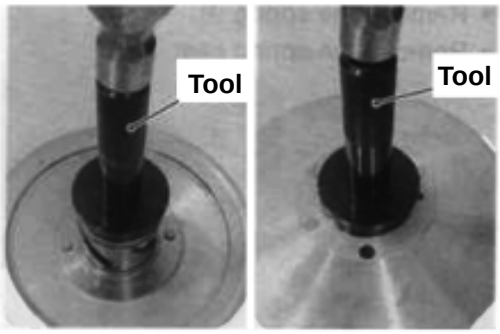
WearandDamage: —Replace.



●Remove Oil Seal.

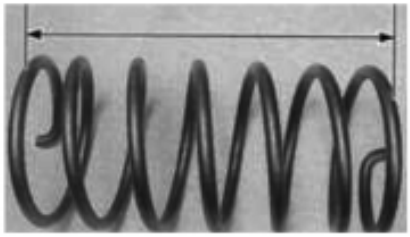
● Install oil seal with special tool.

Tool: Bearing install set



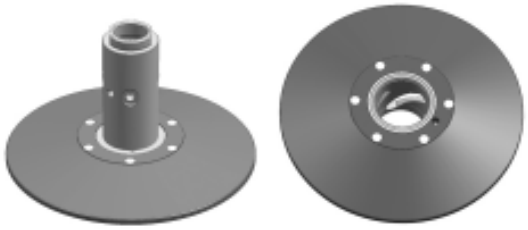
● Use vernier caliper to check the spring free length. If the length is shorter than the service limit, replace with a new one.

Service Limit: 145.4mm



Secondary Sliding and Fixed Sheave:

● Check drive face for any abnormal condition such as stepped wear or damage. Replace if necessary.

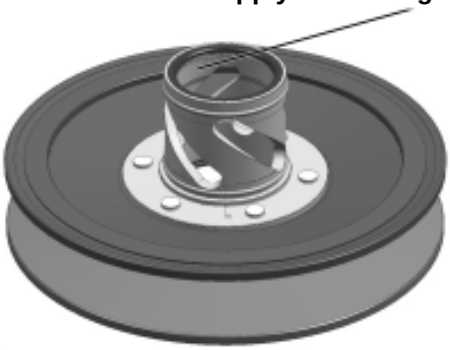


6

Apply lubricant grease

Assembly

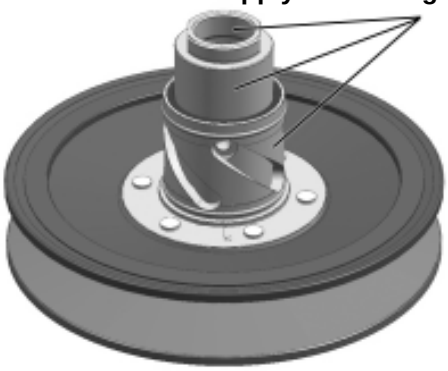
● Install a new O-ring



Apply lubricant grease

● Apply lubricant grease to O-ring, oil seal lip and guide pin groove.

Material: lubricant grease



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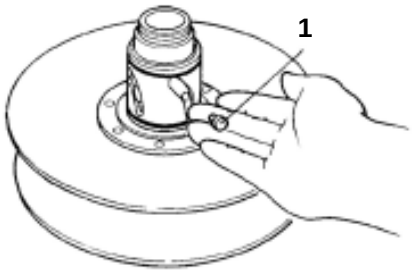
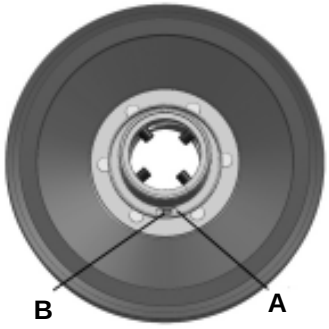
●Install guide pin and spacer 1.



NOTE: To avoid damage to the oil seal lip during assembly, slide the lip with a 0.1mm steel sheet as guide.

●Install spring seat. Align hole A with hole B.



●Install spring and spring plate. Insert spring end into the hole.

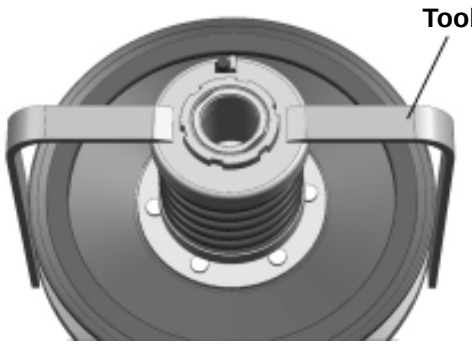
●Compress spring with special tool.

●Align the secondary sheave end with spring plate hole.

Tool: Secondary sheave spring compressor

●Tighten ring nut temporarily.

●Remove the special tool from secondary sheave.

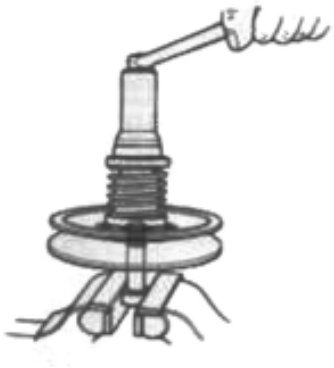


● Tighten the ring nut with special tool to the specified torque.

Ring Nut Tightening Torque:

100N • m

Tool: Ring nut wrench
Sheave holder



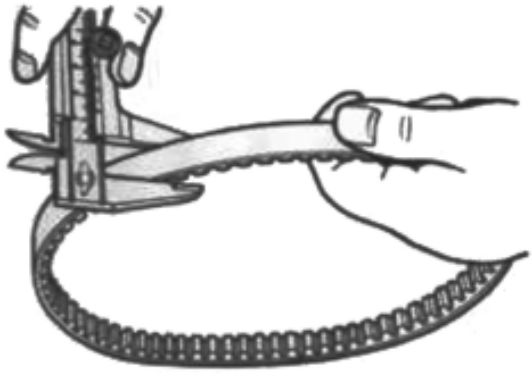
Drive belt

● Check belt for any greasy substance.

● Check contact surface of belt for any cracks and damage

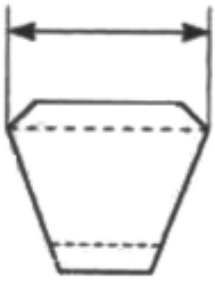
● check belt width with venire caliper

In casse of damage, width out of range, replace with new one.



Belt width service limit:**33.5mm**

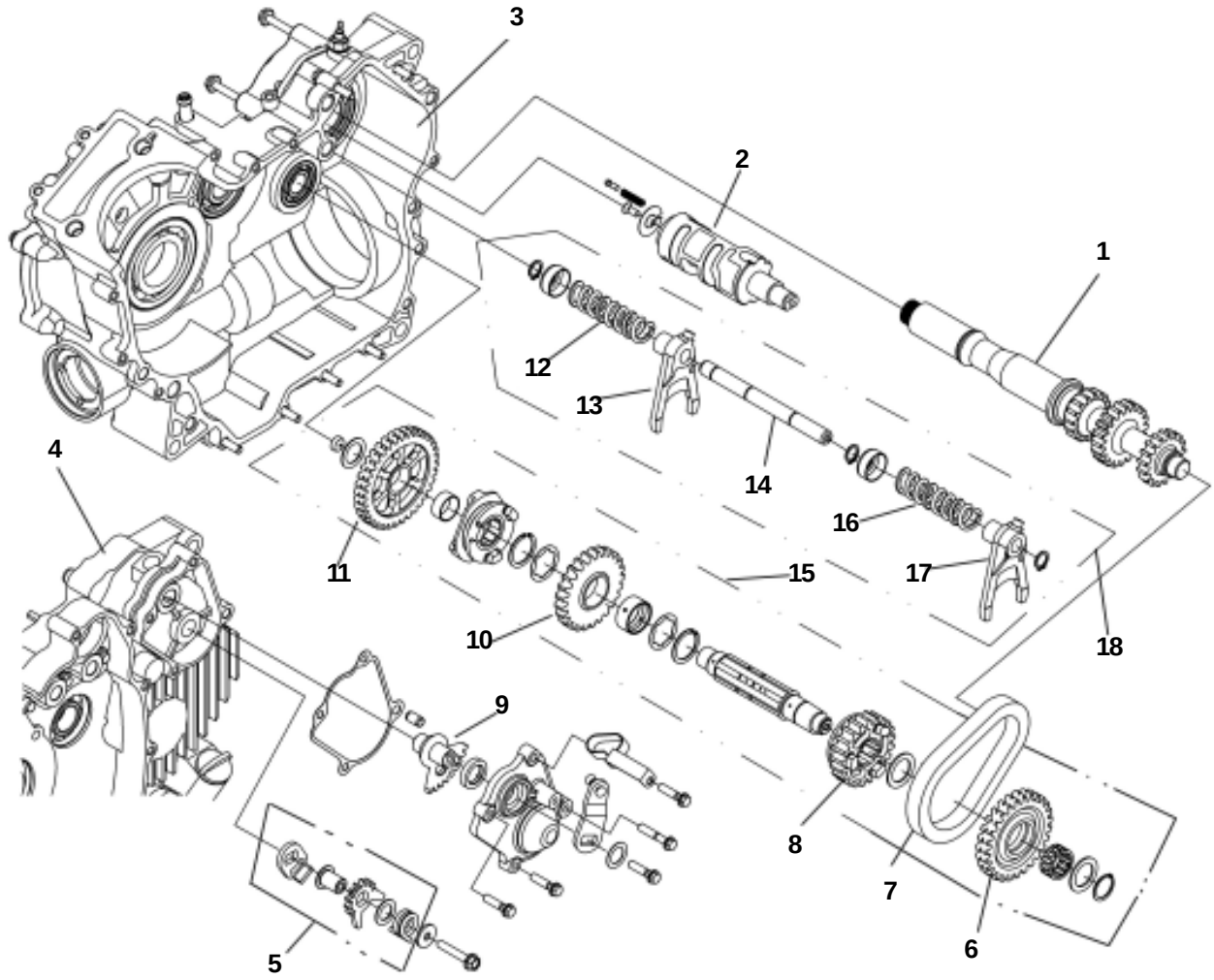
Tool: vernire caliper



WARNING:If belt surface is stained with grease or oil,degrease the belt thoroughly.

Transmission

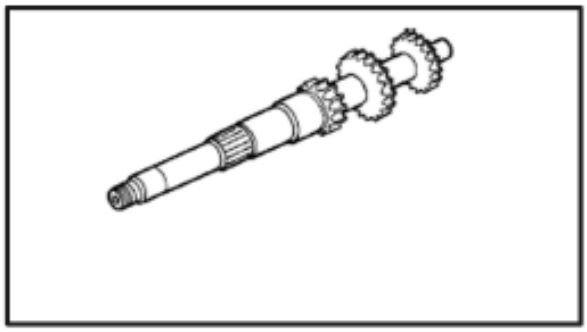
Disassembly



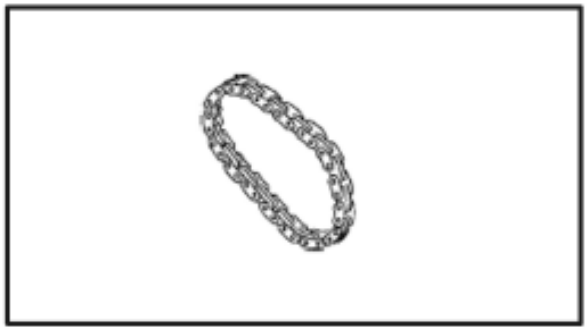
Item	Description	Qty		Item	Description	Qty
1	MAINSHAFT. GEARSHIFT	1		10	DRIVENGEAR, HIGH RANG	1
2	SHIFT CAM	1		11	DRIVENGEAR, LOWRANGE	1
3	RIGHTCRANKCASE	1		12	SPRING, SHIFT FORK	1
4	LEFT CRANKCASE	1		13	RIGHT SHIFT FORK	1
5	DRIVENSECTORGEAR	1		14	GUIDE BAR	1
6	SPROCKET, REVERSEGEAR	1		15	DRIVEN SHAFT	1
7	CHAIN, REVERSEGEAR	1		16	SPRING, SHIFT FORK	1
8	DRIVENOUTPUTGEAR	1		17	LEFT SHIFT FORK	1
9	DRIVE SECTORGEAR	1		18	SHIFT FORK ASSEMBLY	1

Inspection

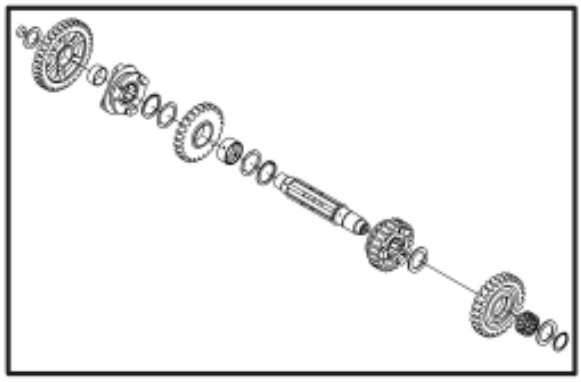
●Inspect drive bevel gear and sprocket for stains, scratch or damage, replace if necessary.



●Inspect reverse gear chain for damage, wear,replace if necessary.



●Disassemble counter shaft as illustration.

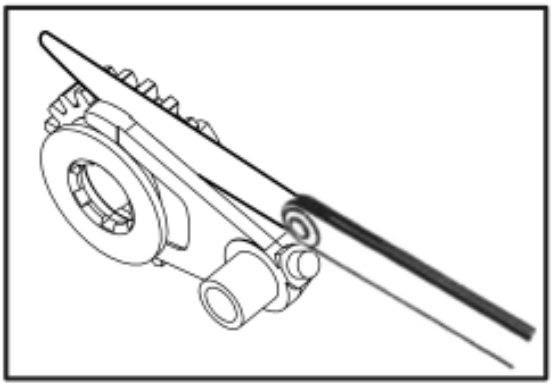


●Inspect bearing surfaces for stains, damage or wear and also for bearing gaskets. Replace if necessary.

● Check the shift fork clearance with a thickness gauge in the groove of its gear.Replace if clearance exceeds the limit.

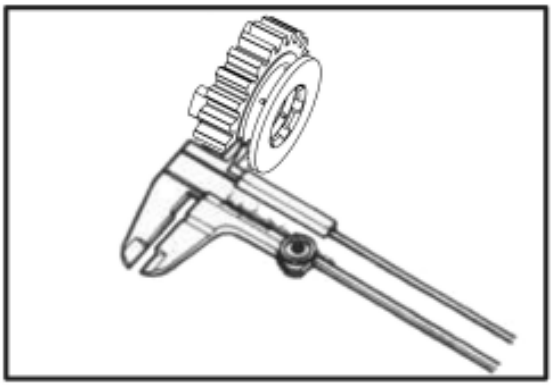
Shiftfork to Groove clearance
Standard:**0.10-0.30mm**

Service Limit: **0.50mm**



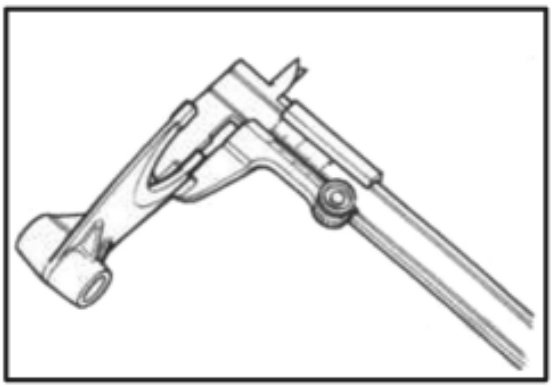
● Measure shift fork groove width with vernier caliper.

Standard shift fork groove width**:**
6.05-6.15mm

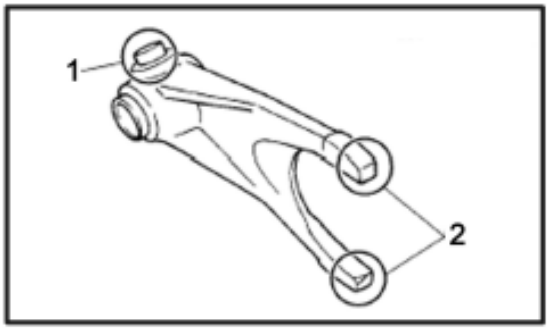


●Measure shift fork thickness with vernier calipers.

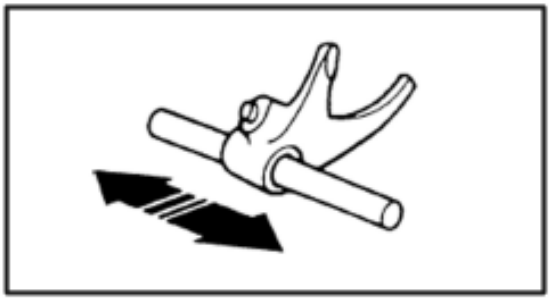
Standard fork thickness:**5.80-5.90mm**



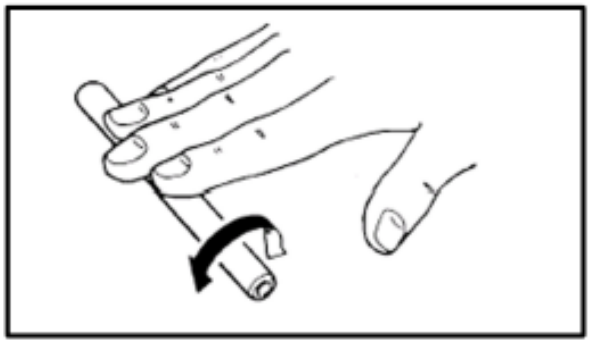
●Check shift fork 1 and 2 for damage or bend, replace if necessary.



●Install shift fork to guide bar and move left and right.In case of any unsmooth moving, replace with a new one.

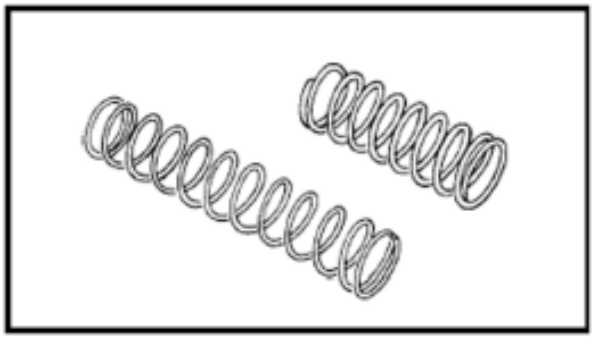


●Put the guide bar on a flat place and roll it. In case of any bend, replace with a new one.

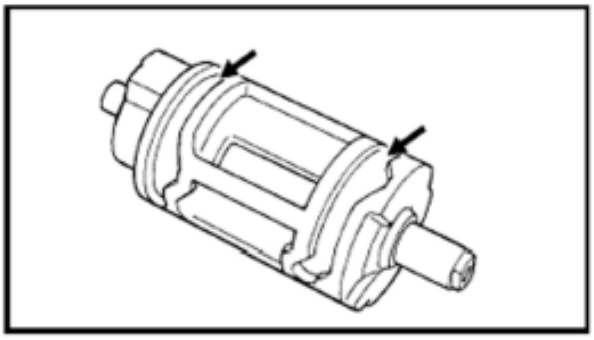


NOTE:DO NOT attempt to correct a bent guide bar.

●Check shift fork spring for damage, repalce if necessary.



●Check shift cam groove for scratches, damage.Replace if necessary.



Assembly

Reverse the removal procedure for assembly. Pay attention to the following.

NOTE:

●Use new retainers. Pay attention to the direction of the retainers. Fit to the side where the thrust is as illustrated.

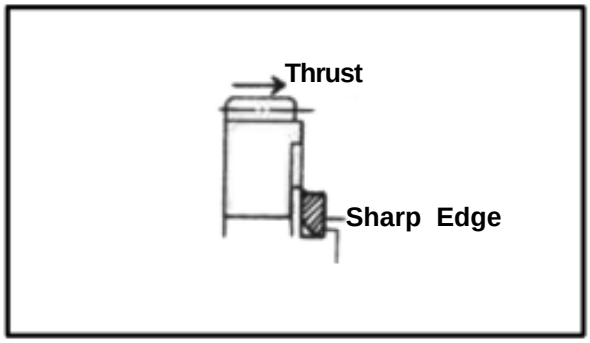
●Coat the gears and shafts with engine oil before assembly.

WARNING:

●Do not reuse the retainers.

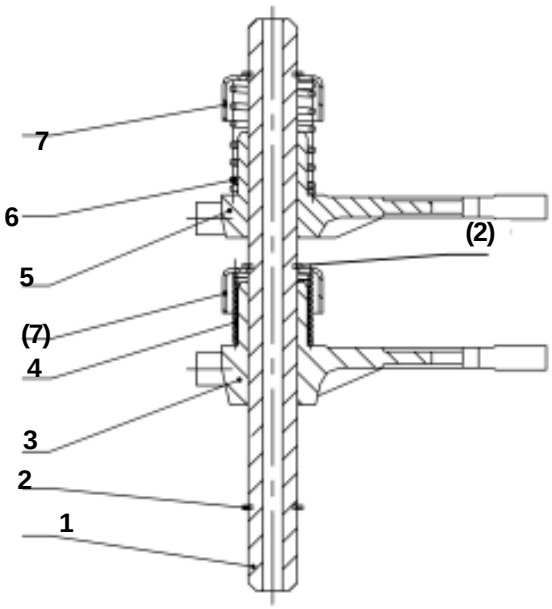
●Do not expand of the gap end of new retainers too wide when assembling.

●Make sure that all the retainers are properly fitted.



●When assembling the guide bar, take care not to assemble the two shift forks and springs in the opposite direction.

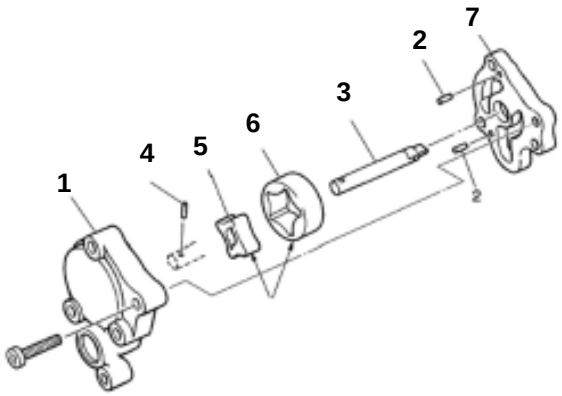
1 Guide bar; 2 Retainer 12;
3 Left shift fork;
4 Shift fork spring(small);
5 Right shift fork;
6 Shift fork spring(big);
7 Spring seat



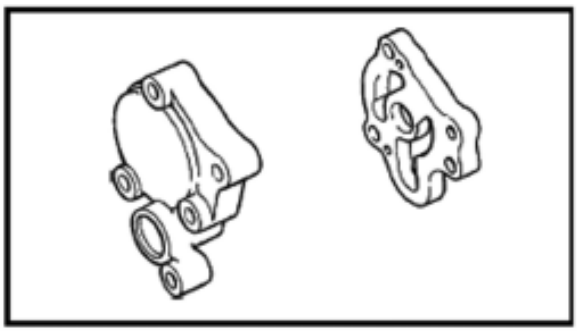
Oil pump

●Disasseble oil pump as illustrated;

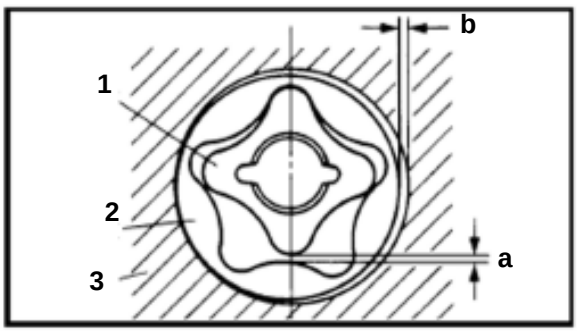
1 Oil pump housing; 2 Dowel pin;
3 Oil pump shaft; 4 Straight pin;
5 Inner rotor, oil pump;
6 Outer rotor, oil pump;
7 Oil pumper cover



●Check oil pump housing and cover for cracks and damage. Replace if necessary.



●Measure the top clearance a between inner and outer rotors and side clearance b between outer rotor and oil pump housing. If the clearance exceeds the limit, replace with new one.



Top clearance**:0.03-0.10mm**

Service limit**:0.15mm**

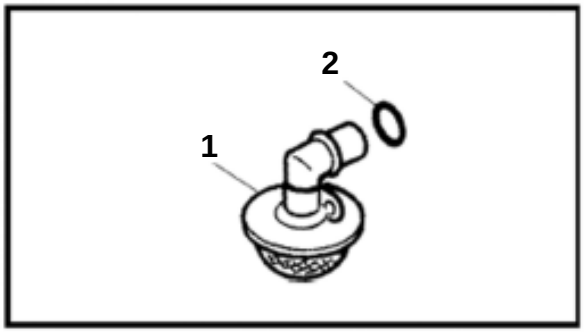
Side clearance:**0.03-0.10mm**

Service limit:**0.12mm**

Oil Strainer Inspection

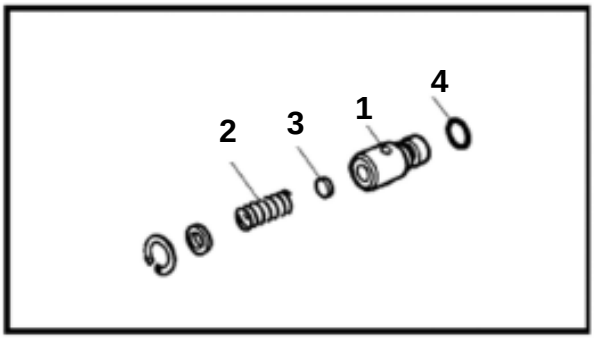
● Check oil strainer 1and O-ring 2 for damage, replace if necessary;

●Clean the surface of oil strainer with engine oil.



Relief Valve

●Check the valve body 1,valve2,spring3,0-ring 4 for damage or wearing. Replace if necessary;



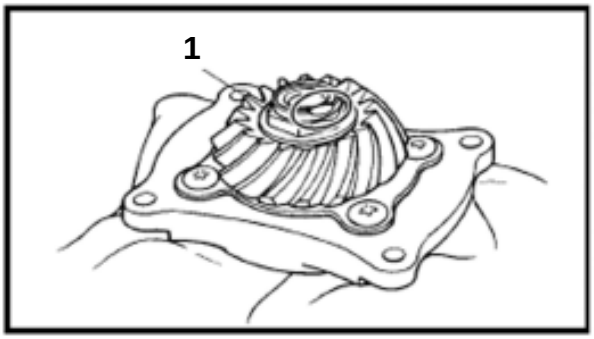
Drive Bevel Gear

●Use a clean rag to protect the drive bevel gear shaft, clamp it to the pliers;

●Loosen drive bevel gear nut 3, remove the drive bevel gear 4 and adjust washer 5;

●Check the drive bevel gear 4 and output driven gear 2 for rust, scratch, wear or damage. Replace if necessary.

●Check if the bearing 8 turns smoothly, replace with a new bearing if necessary.



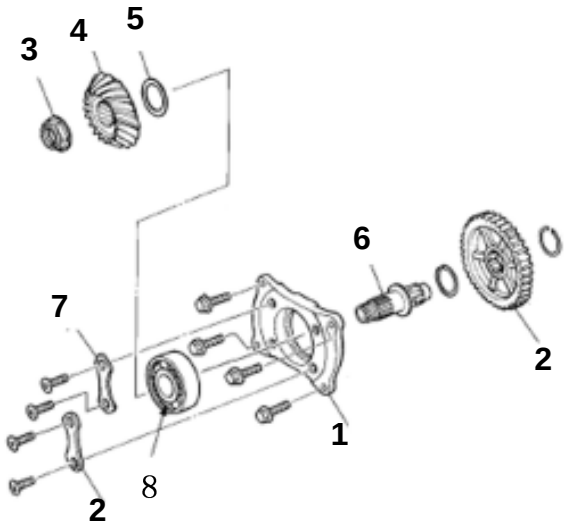
1-Drive bevel gear cover 5-Washer
2-Output driven gear
6--Drive bevel gear shaft
3-Drive bevel gear nut
7- Bearing nut
4-Drive bevel gear 8-Bearing

●Adjust Washer 5 if any of right crankcase, drive bevel gear 4, or drive bevel gear cover 1 is replaced. Refer to bevel gear adjustment for details;

●Apply engine oil to bearing 8 when assembling and tighten nut 3 to the specified torque.

Drive bevel gear nut tightening torque

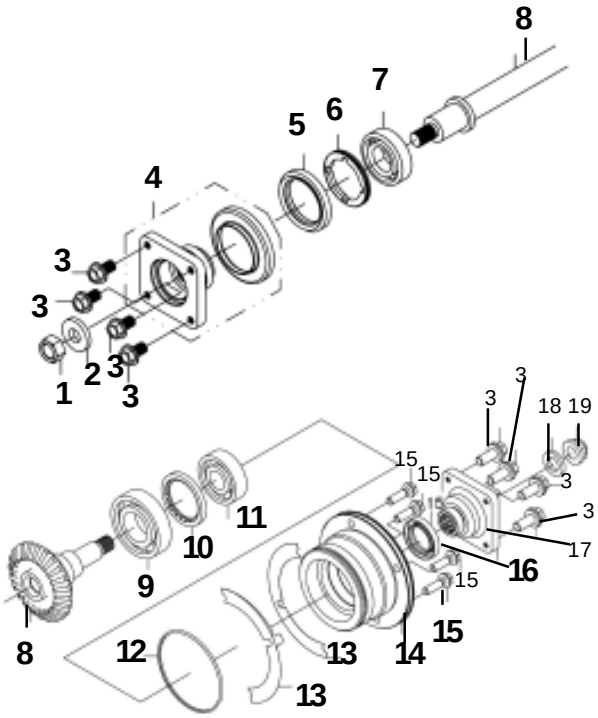
145**N • m**



Front Output Shaft

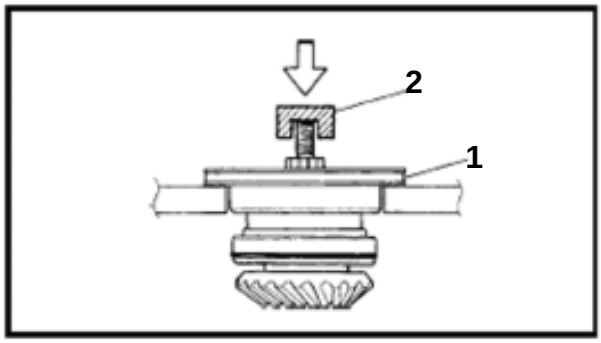
- Check bearing 7 for smooth turning and abnormal wear. Check oil seal 5 for damage. Replace if necessary;
- Apply lubrication oil to bearing 7 and oil seal 5 lip before assembly;
- Apply thread locker to bearing limit nut 6 (left thread) and tighten to the specified torque. (80N.m)

Tighten Nut 1 to the specified torque, front output shaft nut tightening torque: 97**N.m**

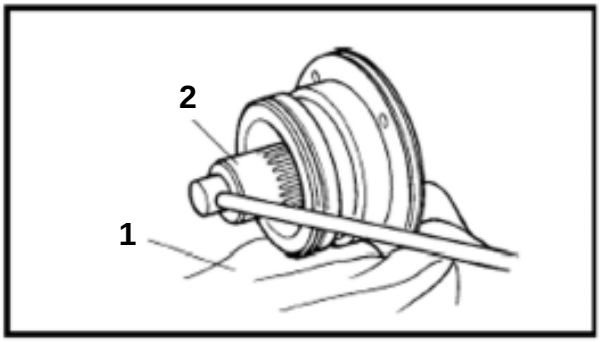


Driven Bevel Gear

- Remove nut 19, washer 18, coupler 17 and oil seal 16.
- Protect end thread of driven bevel gear with proper device 2 Fix bevel gear cover 14 and press out driven bevel gear.



- Place a clean rag 1under bevel gear cover. Remove bearing limit nut 10 with special tool 2 and remove bearing;
- Check driven bevel gear 8 surface for scratches, wear.Scratch or wear, replace;
- Check free turning of bearing 9 and 11. Replace if necessary;
- Use new oil seal 16 and O-ring 12 when assembling;
- Adjust washer 13 if any of right crankcase, driven bevel gear 8 or driven bevel gear cover 14 is replaced. Refer to bevel gear ad-justment for details;

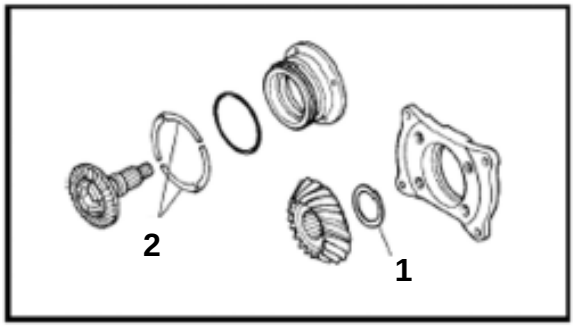


- Apply lubrication oil to bearing 9 and 11 and oil seal 16, O-ring.Apply thread locker to nut 10 and tighten to the specified torque.**(110N.m)**

Tool: driven bevel gear nut wrench

Driven bevel gear nut tightening torque:150N.m.

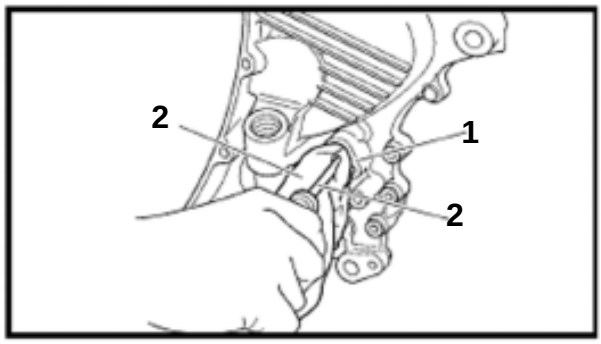
Bevel Gear Washer Adjustment



- Adjust washer 1and 2 when replacing crankcase and/or bevel gear and/or bevel gear cover.

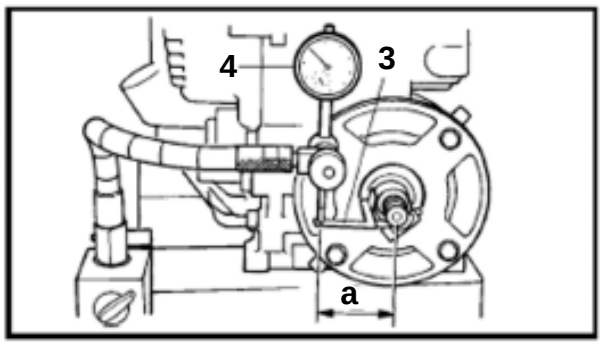
Bevel Gear

NOTE: Proper bevel gear engagement depends on that the gear backlash & tooth contact are within the proper range.



△ Bevel Gear Backlash

●Install drive and driven gears to the crankcase. Wrap a (-) screwdriver 3 with a rag 2 and insert it into the speed sensor hole 1 of left crankcase to fix the drive bevel gear;



●Install special tool 3 and micrimeter 4

Tool: level gear side clearance

dial gauge micrometer

a=46mm

●Turn the driven bevel gear in each direction and measure the backlash.

NOTE: Measure four points in the mutual vertical direction.

●If the backlash is not within the specification,adjust the thickness of the driven bevel gear adjust washer.
Re-check the backlash until the back-lash is correct.

Bevel gear backlash:**0.1-0.2mm**

Adjustment:

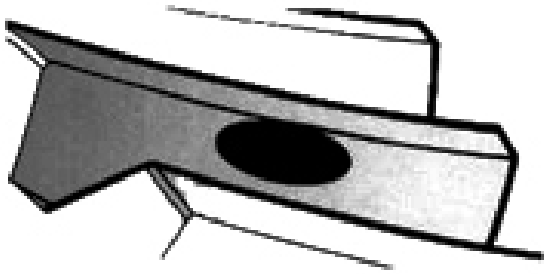
Backlash	Washer thickness adjustment
＜0.1mm	Washer thickness adjustment
0.1~0.2mm	OK
＞0.2mm	Increase thickness

△ Tooth Contact Inspection

After adjusting the backlash, check the tooth contact according to the following procedures:

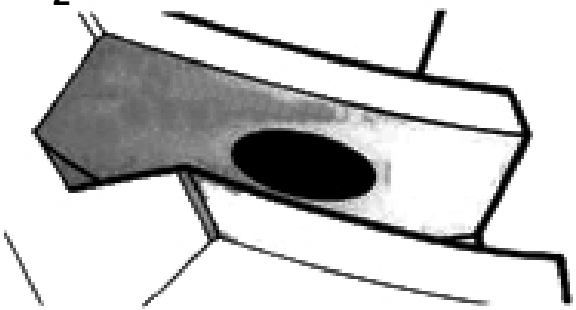
- Remove drive and driven bevelgear shafts from crankcase;
- Clean and degrease every tooth of drive and driven bevel gear;
- Coat the driven bevel gear with machenist's layout dye or paste;
- Install drive and driven bevel gear;
- Rotate the driven bevel gear several turns in both directions;
- Remove drive and driven bevel gear shafts and check the coated teeth of the drive bevel gear;

1



Contact 1	tooth top	Incorrect
Contact2	Middle	Correct
Contact3	Bottom	Incorrect

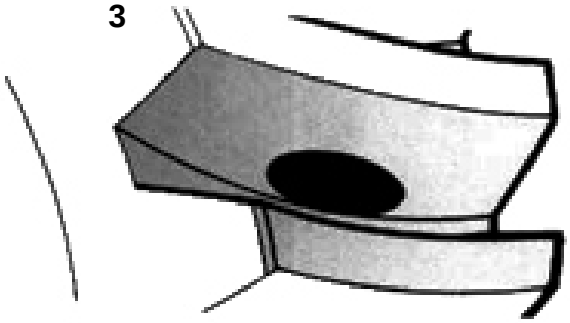
2



- If tooth contact is correct(Contact 2), continue next procedure;
- If tooth contact is incorrect(Contact 1&Contact3), adjust the thickness of shim for the drive gear. Repeat above steps to check tooth contact until correct.

Adjustment:

3

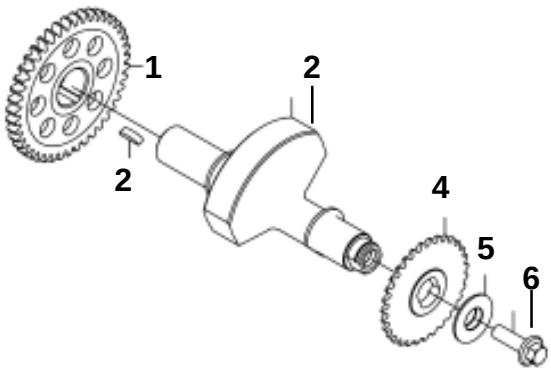


Tooth contact	Thickness adjustment
Contact 1	Decrease thickness
Contact 3	Increase thickness

NOTE:

- After adjusting the tooth contact, the backlash must be checked again;
- If the backlash is adjusted but tooth contact is still out of specification, replace the drive and driven bevel gears;
- Both tooth contact and backlash should be within the required specification.

Balance Shaft



●Remove the parts as illustrated on the right.
Check each part for abnormal wear or damage.
Replace if necessary.

1.Balance shaft gear
2.woodruf key 3.Balance shaft;
4.Balance shaft sprocket
5.Washer 6.Bolt

Magneto Rotor

●Remove starter clutch nut.

● Check starter clutch roller and holder for abnormal wear or damage,replace if necessary.

●Replace the starter clutch in the right direction.

NOTE: When install the starter clutch to the magneto rotor, make sure side A is in the right direction.

■Face arrow mark B to the engine side.

■Apply engine oil to starter clutch

■Apply thread locker to bolt and tighten to the specified torque.

Tightening torque of starter clutch bolt: 26**N.m.**

Material: Thread locker

●Install the starter driven gear.

●Make that the starter driven gear turns in the opposite direction of the arrow mark B.The gear cannot turn in the direction of the arrow.

●Check starter driven gear bearing. In case of anything unusual, replace the bearing.

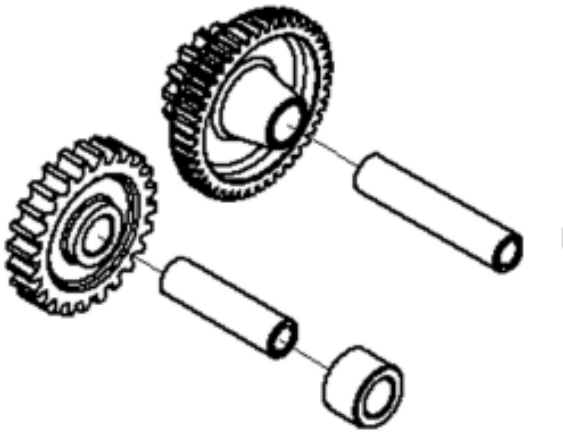
●Remove starter driven gear bearing with special tool.

●Install starter driven gear bearing with special tool.

Tool: Bearing installer/Remover

Electric Starter Gear

●Check the gear surface for nicks or damage, replace if necessary;



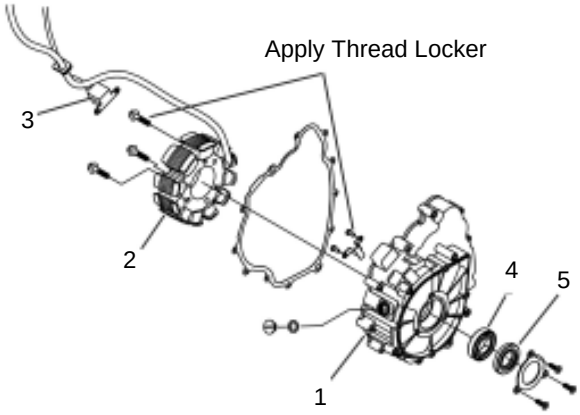
Left crank case cover:

● Check magneto stator coil 2, pickup coil 3 for damage,replace circuit if necessary;

● Check bearing 4 for smooth turning. If it is stuck, replace with a new one;

●Check oil seal 5 for damage. Replace if it is damaged.

●Apply thread locker to the bolt when assembling;

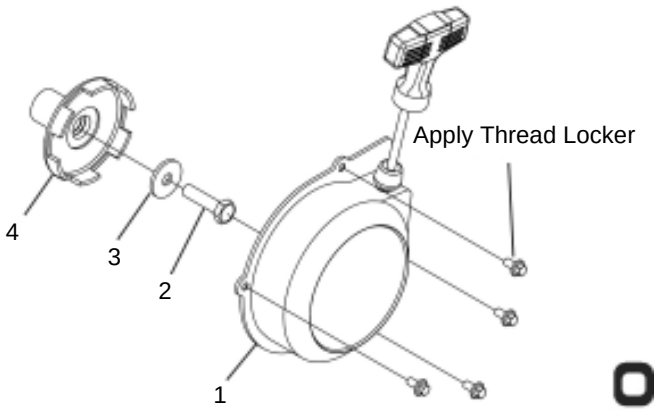


Tightening torque for magneto coil bolt:**10N • m**

● Apply lubricating oil to bearing 4 and lubricant grease to lip of oil seal 5 when assembling.

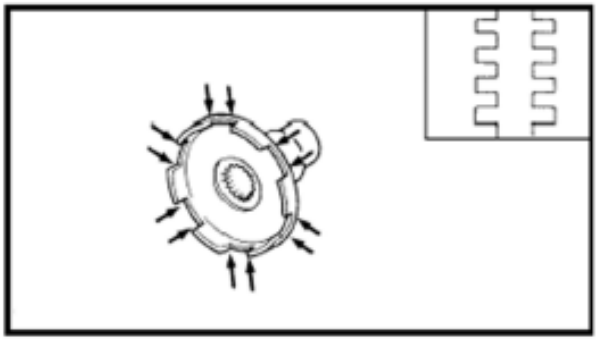
Recoil starter disassembly:

1-Recoil starter
2-Bolt
3-Washer
4-Starter pulley



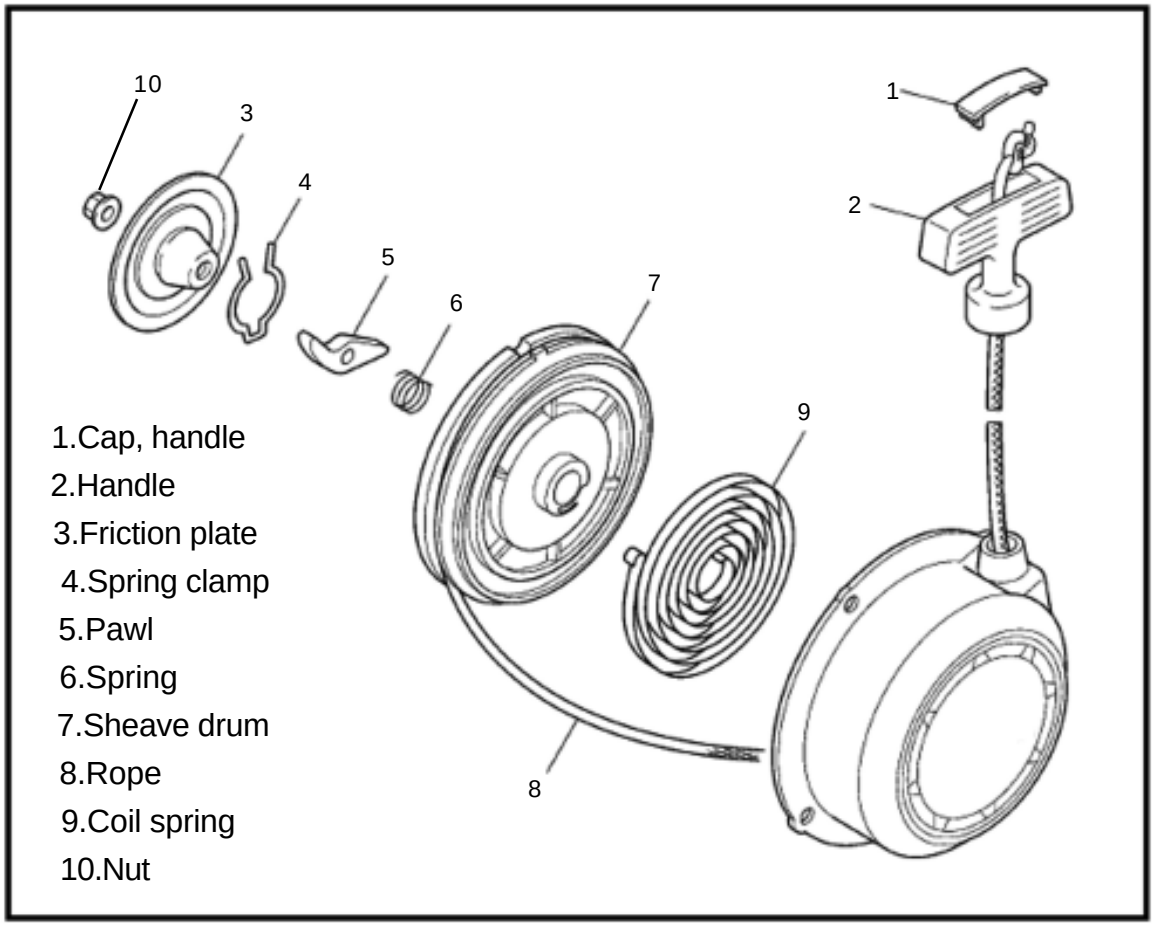
Inspection

Check sheave drum for burrs, cracks or rust. In case of any abnormal, replace.



Recoil Starter

●Disassembly is unnecessary if recoil starter works well.



Disassembly

● Remove nut 10 and the parts from the starter housing.

WARNING: The coil spring may quickly unwind and cause injury when the sheave drum is opened. Wear proper hand and eye protection beforehand.

Inspection

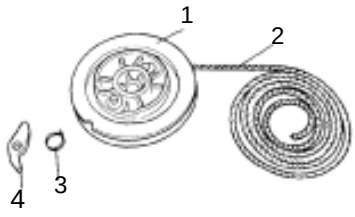
●Check all parts for damage. Repalce if necessary.

Assembly

Reverse the removal procedure for installation and pay attention to the following:

Install sheave drum 1, rope 2, coil spring 3, Damper 4.

Wind the rope clockwise around the sheave drum three times and hook the rope at "a" of sheave drum.



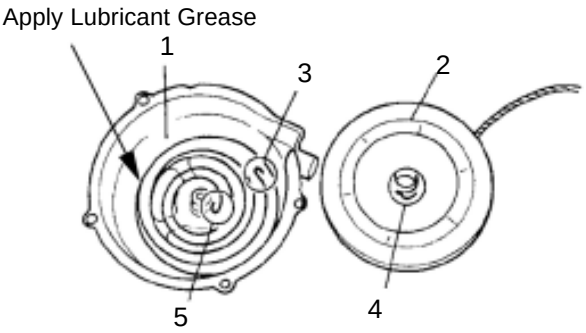
WARNING: The coil spring may quickly unwind and cause injury when the sheave drum is opened. Wear proper hand and eye protection beforehand.

Install coil spring 1 and sheave drum 2;

Apply lubricant grease to spring;

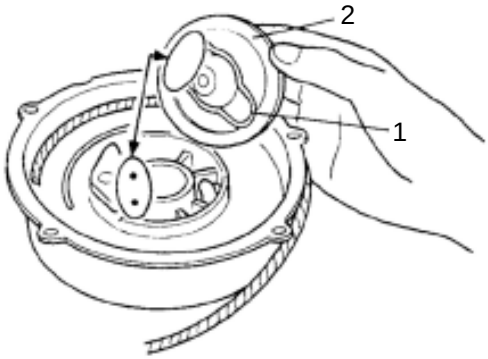
Hook coil spring end 3 to the starter housing, wind the coil spring clockwise

Hook the other end 5 of coil spring to hook part 4 of sheave drum.

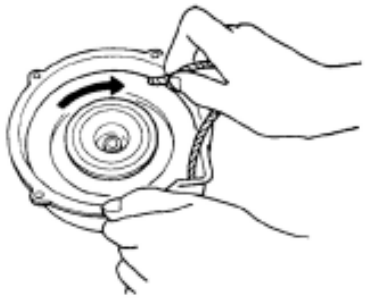


Install spring clamp 1, friction plate 2 and bolt

Put the end of spring clamp in the groove near the damper.



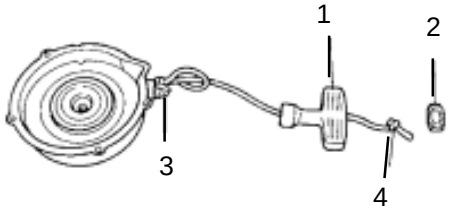
Turn sheave drum clockwise three times to reload re-coil spring.



Install handle 1 and handle cap 2

Lead the rope through the hole of the starter housing and tie a knot 3 so that the rope would not be drawn back.

After making a tie 4,draw back previous one 3.



CVT COVER

● Remove screw 5, oil seal limitator 4 .Remove oil seal 3 with sepecial tool;

● Check bearing 2 for free turning. In case of any abnormal, remove with special tool and replace with a new bearing;

● Apply lubrication oil to outer ring of bearing and install bearing with special tool. Check bearing for smooth turning.

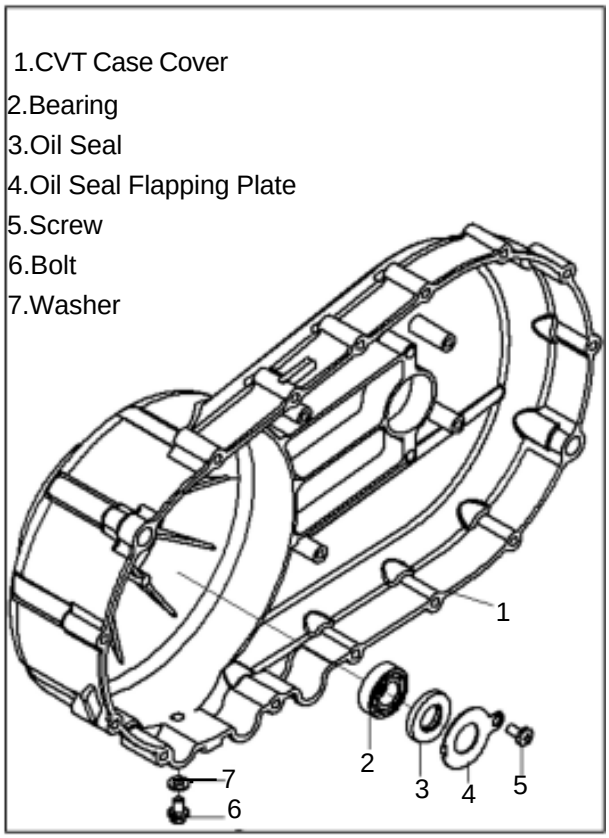
●Apply grease to bearing inner side

● Apply grease oil seal lip and install bearing with special tool. Check bearing for smooth turning;

NOTE: Use a new oil seal

●Install oil seal limitator and tighten screw after applying thread locker.

Tool:Bearing remover
Oil seal remover
Bearing installer



CVT Case

●Check bearing 5 for smooth turning. In case of any abnormal, remove screw 3 and bearing retainer 4 and replace with a new bearing.

●Check oil seal 7. In case of any damage, replace it.

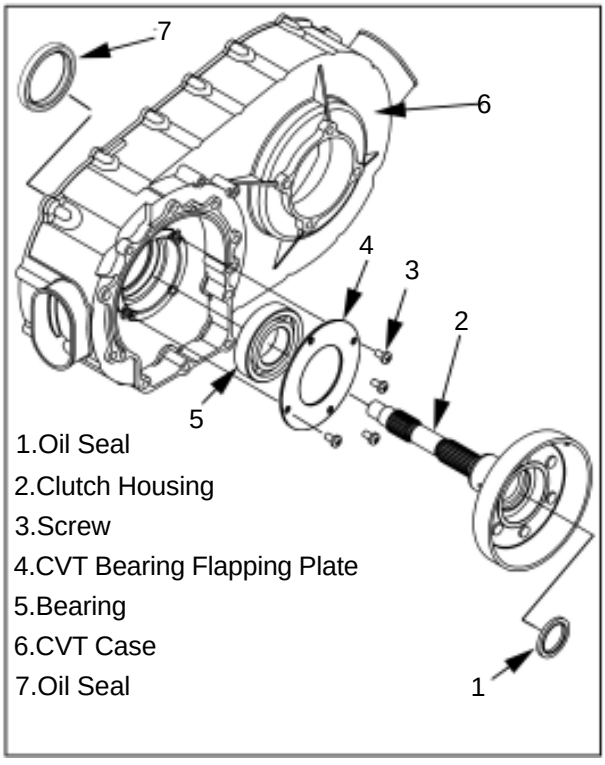
●Apply grease to oil seal lip and install with special tool;

● Apply lubrication oil to bearing 5 and install with special tool; Check bearing for smooth turning. The seal side of bearing 5 should face bearing retainer 4.

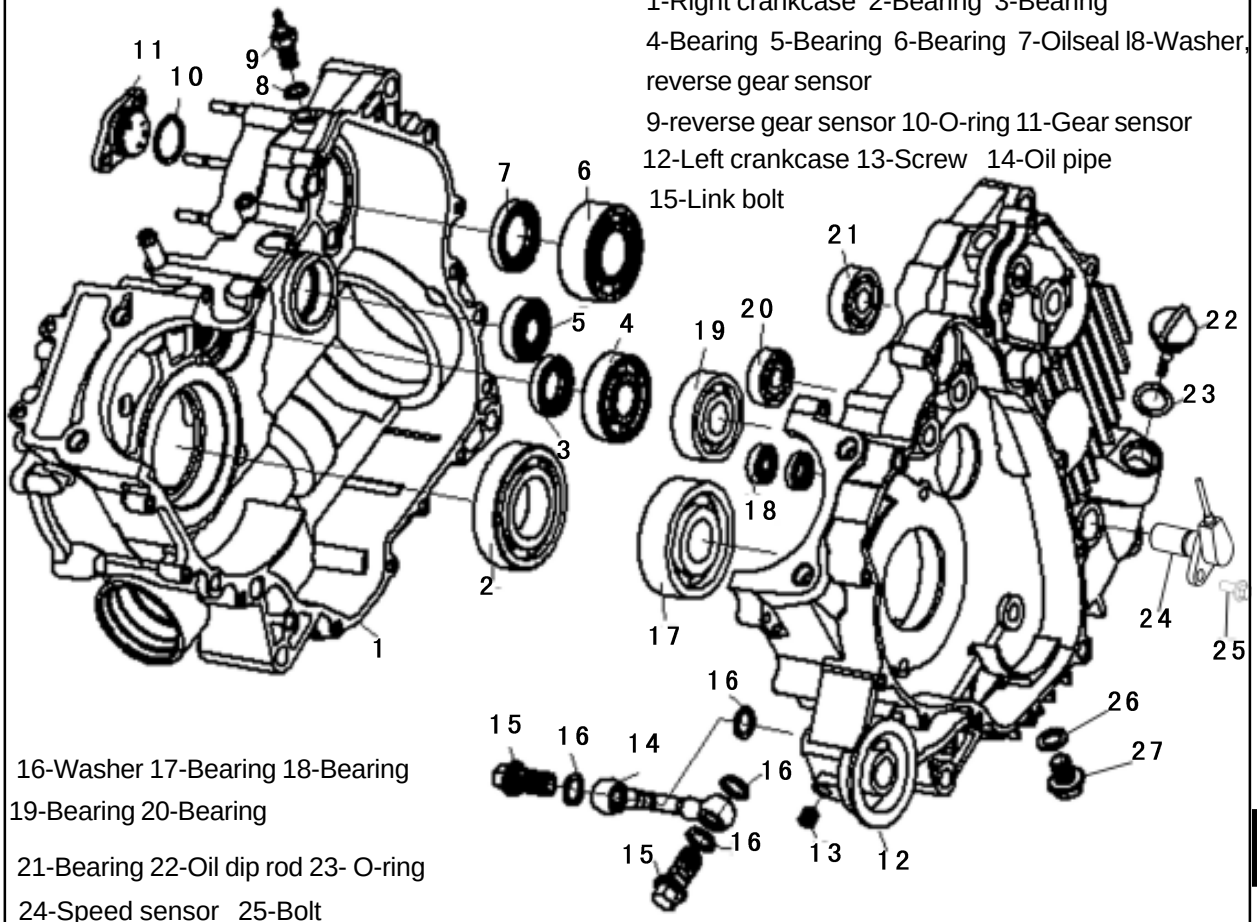
●Install bearing retainer 4 and screw 3;

●Install oil seal 1 into clutch housing 2 with special tool;

Tool:Oil seal installer
Bearing installer

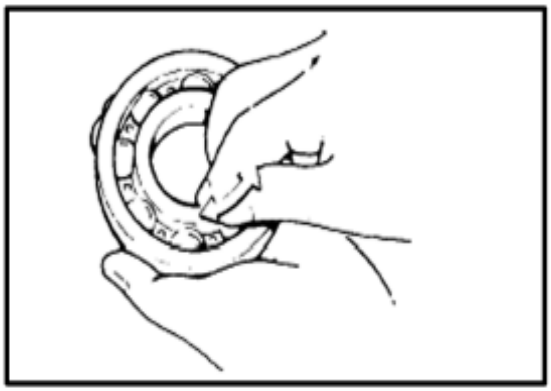


Crankcase



1-Right crankcase 2-Bearing 3-Bearing
4-Bearing 5-Bearing 6-Bearing 7-Oilseal l8-Washer, reverse gear sensor
9-reverse gear sensor 10-O-ring 11-Gear sensor
12-Left crankcase 13-Screw 14-Oil pipe
15-Link bolt
16-Washer 17-Bearing 18-Bearing
19-Bearing 20-Bearing
21-Bearing 22-Oil dip rod 23- O-ring
24-Speed sensor 25-Bolt
26-Washer 27-Oil drainage bolt

●Clean and grease the bearings, turn the inner race of bearing and check the play, noise and smooth turning. In case of any abnormal, remove bearing with special tool and replace;



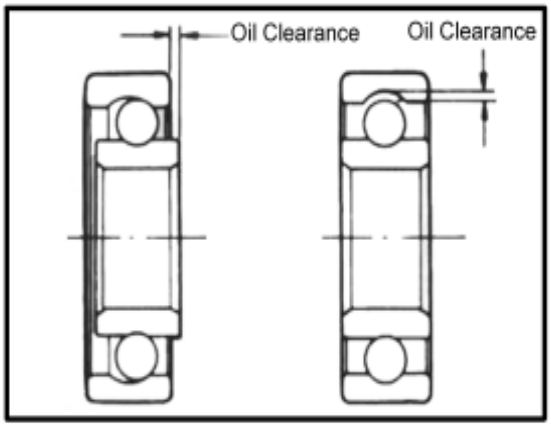
●Check all the oil seals for wear or damage. In case of any wear or damage, remove with special tool and replace with a new oil seal;

● Remove gear sensor 11 and check for continuity with reverse gear sensor 9 with a multimeter;

●Remove link bolt and oil pipe 14 and check oil pipe for crack or clog. Replace with a new one if any;

●Remove drainange bolt 27&clean it;

●Use special tools to assemble bearnig or oil selas. Lubricant oil is applied for bearing and oil seal lips. Check bearing smooth turning after installation



NOTE:Check bearing for smooth turning after installing.

●Install new o-ring and apply grease;

●Install gear sensor;

● Install reverse gear sensor 9 and tighten to the specified torque

Tightening torque:**20N • m**

●Install speed sensor 24

●Install oil pipe and tighten the link bolt to the specified torque:

Tightening torque:**18N • m**

● Install washer 26 and oil drainage bolt 27 and tighten to the specified torque;

Tightening torque:**30N • m**

Tool:Bearing remover
Bearing installer
Multimeter

Ⅲ Engine Assembly

Reverse the engine removal procedure for installation.

NOTE:
■Clean all the parts before assembly;
■Make sure that the parts are in good condition without any damage;
■ Apply engine oil to the moving parts before assembly;
■Apply grease to oil seal-lip&O-ring

CAUTION: Make sure that drive belt, primary and secondary sheaves are clean,dirt and grease free.

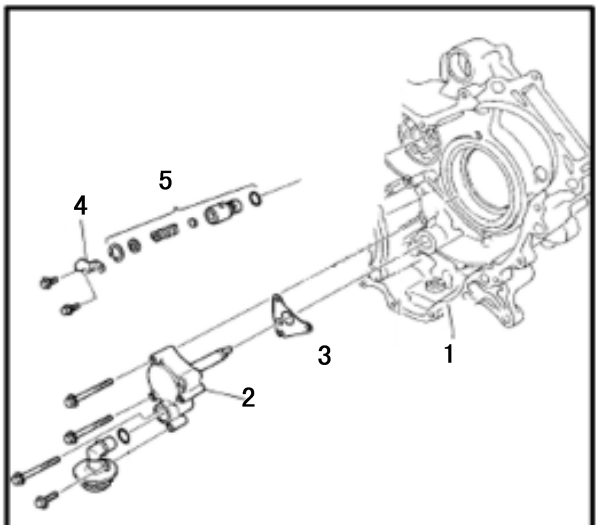
Engine Center

Oil pump and relief valve

●Install oil pump and relief valve to left crankcase, as illustrated on the right. Tighten to the specified torque:

Oil pump bolt:**10N • m**

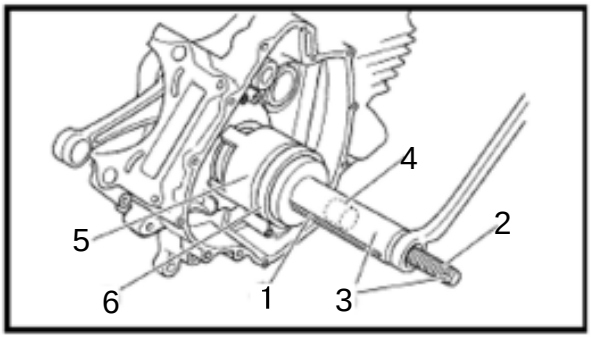
Relief valve bolt:**10N • m**



1.Left crankcase 2.Oil pipe
3.Oil pipe washer
4.Pressure strip, relief
5.Relief valve

Crankshaft

●Install crankshaft to left crankcase with special tool.



NOTE:

■Do not hammer the crankshaft into crankcase with plastic mallet;

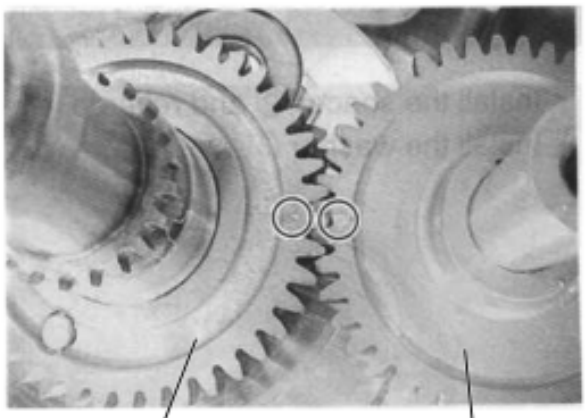
■Use special tool to avoid affect of conrod precision

Tool:control installer

Balance Shaft

●Install balance shaft.

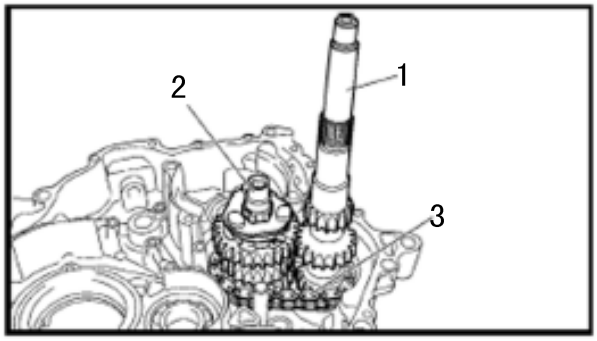
CAUTION: Balancer shaft driven gear should be aligned to the mark as illustrated.



6

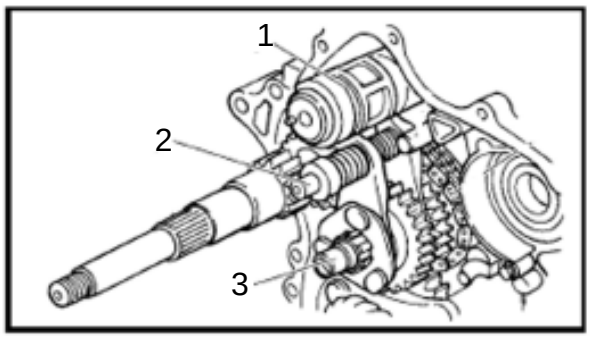
Main Shaft,Counter Shaft

●Install main shaft and counter shaft.



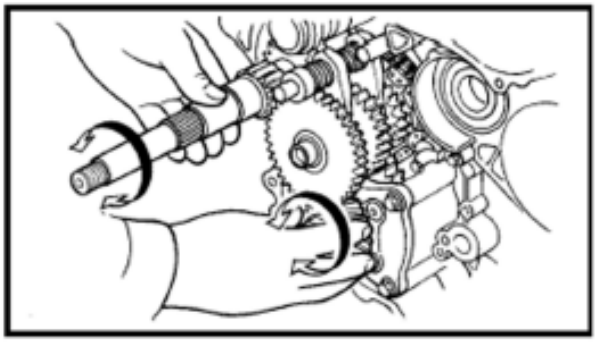
CFMOTO

Shift Cam, Shift Fork



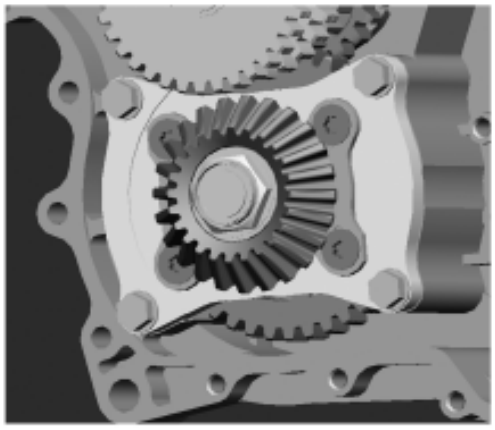
●Install shift cam 1 and shift fork 2.

●Check each part for smooth turning.
●Install low range driven gear to counter shaft 3.



●Spray adequate engine oil to each part.

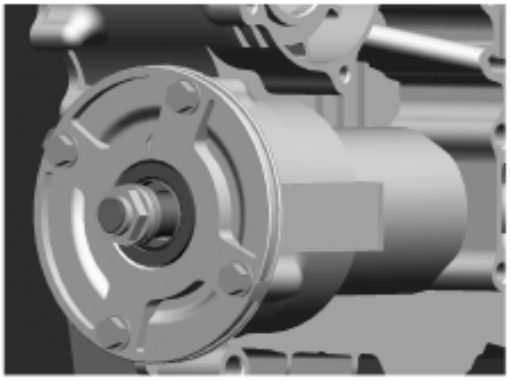
Drive Bevel Gear



●Install drive bevel gear and tighten to the specified torque.

Drive bevel gear tightening torque:32N • m

Right Crankcase
Driven Bevel Gear

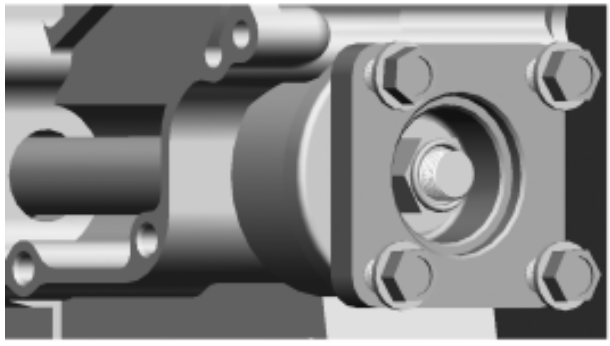


●Install driven bevel gear and tighten to the specified torque;

Driven bevel gear tightening torque:25N • m

●Check bevel gear backlash
(Refer to 6-44)

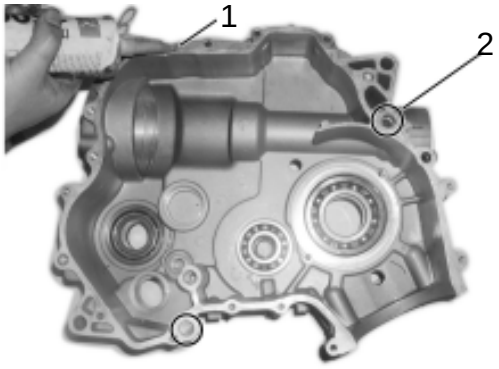
Front Output Shaft



●Install front output shaft to right crankcase.

● Apply sealant 1 to the mating face of right crankcase;

NOTE: Apply sealant evenly in a uninterrupted thin line



●Install 2 dowel pins 2;

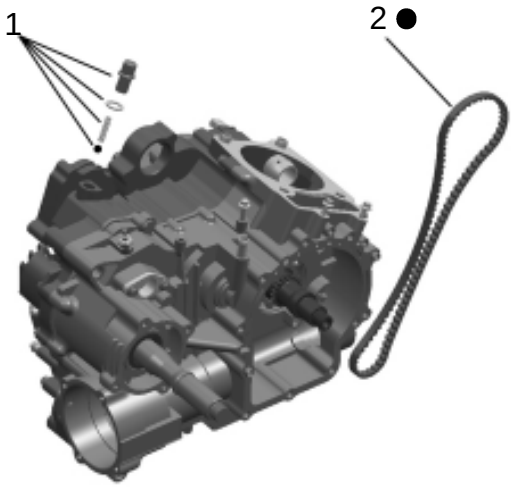
●Assemble crankcase and tap slightly with a rubber hammer for proper fitting;

●Install bolt and tighten to the specified torque:

M6：**10N • m**

M8: **25N • m**

NOTE: Crankcase bolts should be tightened diagonally in several steps.



Gear Positioning Bolt

●Place the steel ball and install gear positioning bolt 1 and tighten the bolt to the specified torque:

Tightening torque:**18N • m**

Engine Right

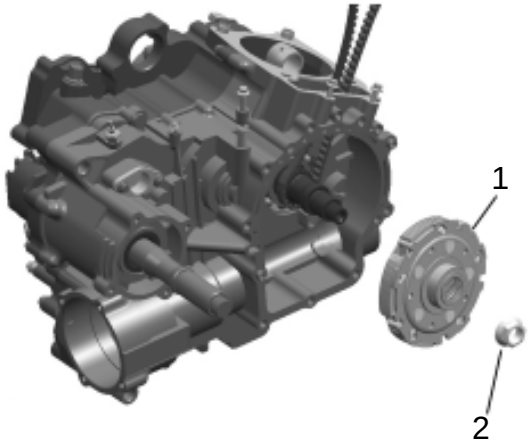
Timing Chain

● Put on timing chain 2.

Clutch

● Install clutch 1 and nut 2. Tighten the nut to the specified torque(left thread);

Clutch nut tightening torque:**70N • m**



●Intall new O-ring 6 in spacer 8.

●Install spacer 8 onto the clutch housing shaft, then install into CVT case 7.

NOTE: align oil noter on spacer with oil hole on the shaft.

CVT Case

●Install dowel pin 4,gasket 2 gasket5,intall CVT case assembly to the right crankcase.

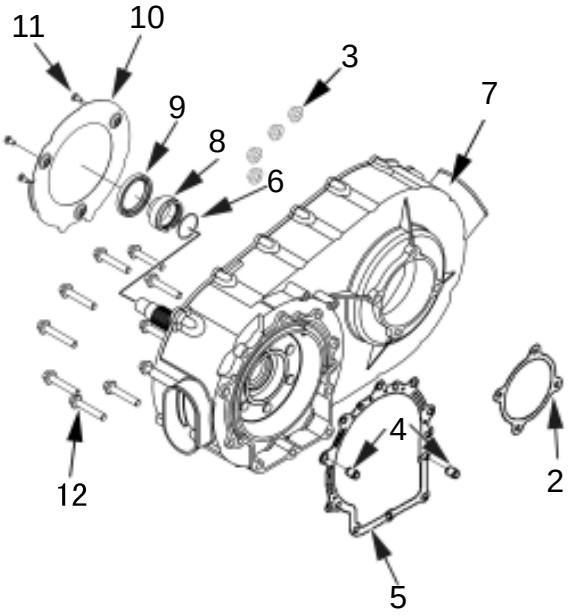
●Install bolt 12 and nut 3.

NOTE:

■Tighten bolt/nut diagonally

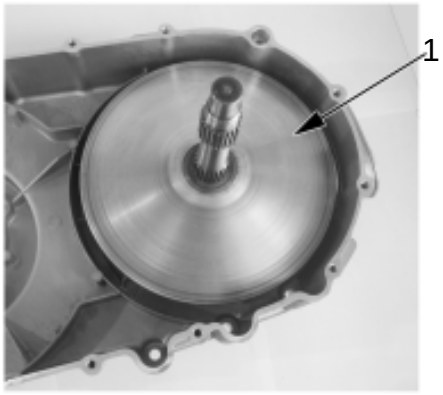
■Use a new gasket

●Install guide plate 10 and screw 11.



Primary sheave,secondary sheave,drive Belt

●Install primary fixed sheave 1 as illustrated on the right.

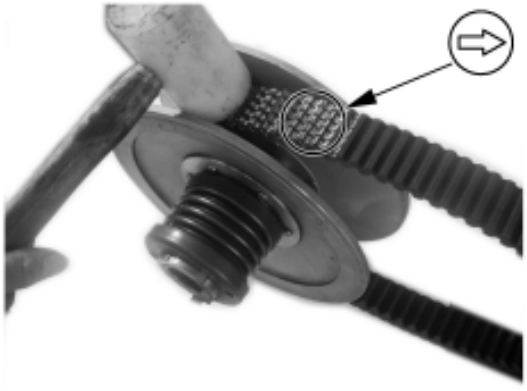


●Install drive belt on secondary sheave and tap with a plastic hammer to keep the belt as low as possible.

NOTE:

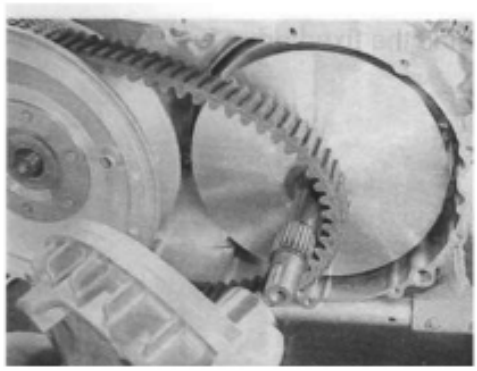
■Install the drive belt with the arrow on the belt turn in the clockwise direction;

■Drive belt contact surface should be free from any grease or oil.



●Install secondary sheave.

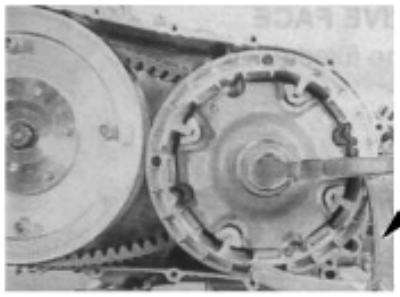
●Install primary sliding sheave.



●Tighten primary sheave nut with special tool to the specified torque.

Primary sheave nut tightening torque:**115N • m**

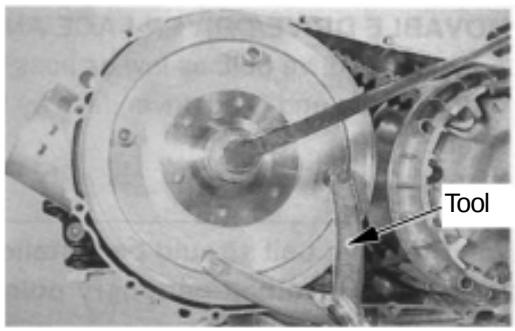
Tool:CVT Holder



●Tighten secondary sheave nut with special tool to the specified torque.

Secondary sheave tightening torque:**115N • m**

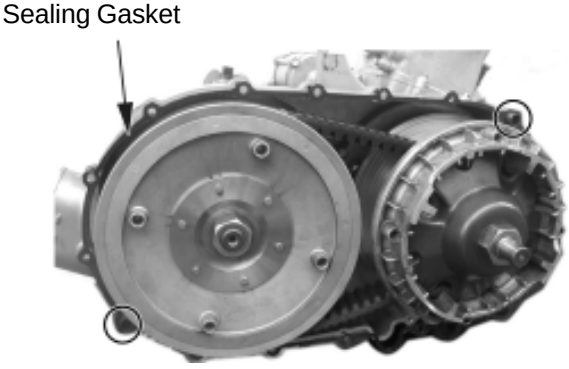
Tool: Rotor holder



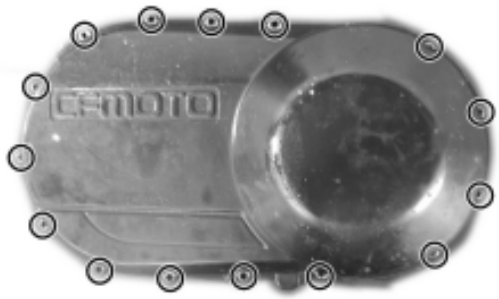
NOTE: Turn the primary sheave until the belt is seated in and both primary and secondary sheaves move together smoothly.

CVT case cover

●Install the new gasket and dowel pins.



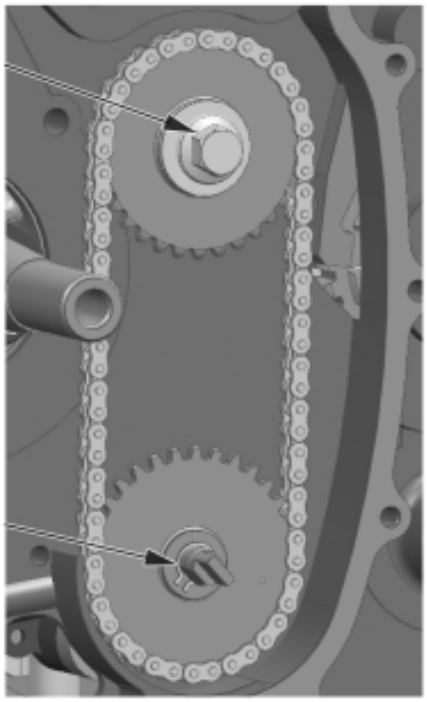
●Install CVT case cover bolts and tighten diagonally in several steps.



Engine left

Oil pump sprocket and chain

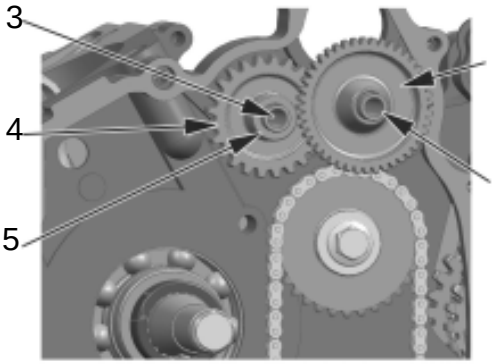
●Install oil pump drive sprocket;
●Install oil pump driven sprocket;
●Install oil pump drive chain;
●Tighten oil pump sprocket bolt;
●Install sprocket retainer with a long nose pliers.
Tool: Long nose pliers.



Dual gear/idler gear

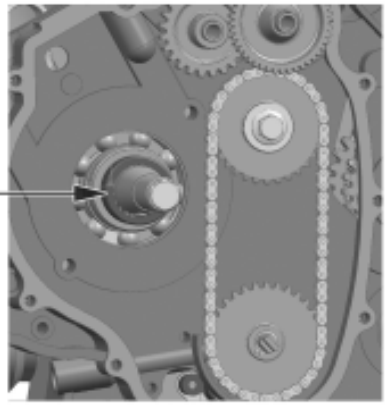
●Install dual gear shaft 1 and dual gear 2.

●Install idler gear shaft 3,idler gear 4 and bush 5.

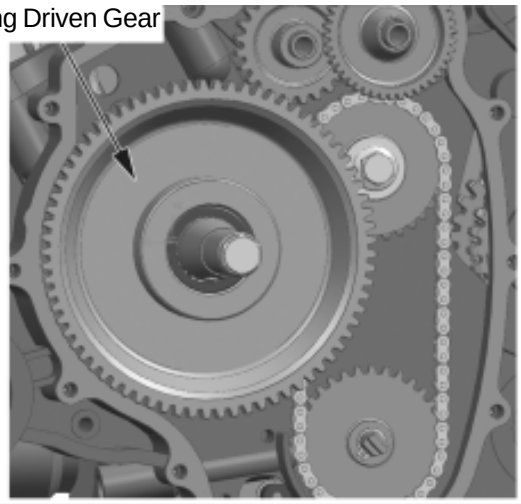


Starter driven gear

●Install starting driven gear bush 6.



●Install starting driven gear.

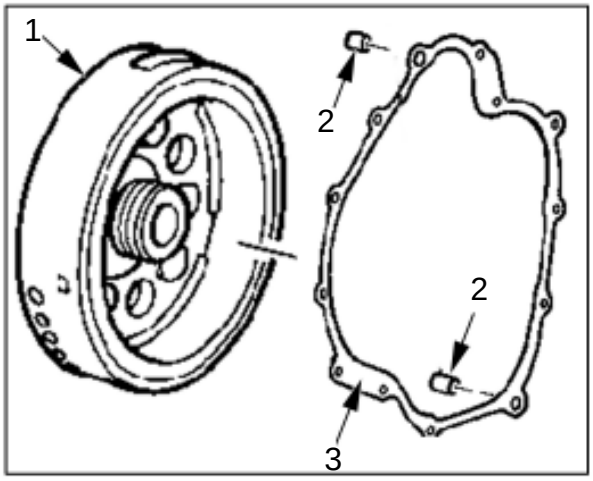


Magneto rotor

●Install woodruff key into crankshaft groove.

●Intall magneto rotor 1.

NOTE: Degrease the tapered part of rotor and crankshaft. Use nonflammable solvent to clean off the oily or greasy matter and fully dry the surfaces.



Left crankcase cover

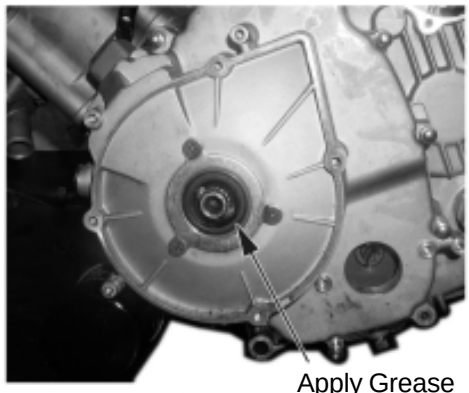
●Install dowel pin 2 and gasket 3;

NOTE: Use a new gasket

●Apply lubricant grease to oil lip.

●Install left crankcase cover.

●Install bolts.



Recoil starter

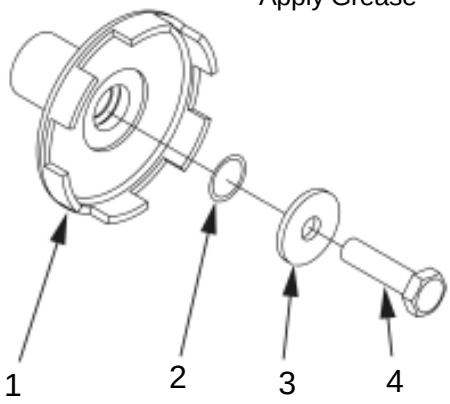
●Install recoil starter 1.

●Install O-ring 2.

NOTE: Use a new O-ring and apply lubricant grease to the O-ring

●Install washer 3 and bolt 4, tighten to the specified torque.

Recoil starter bolt tightening torque:55N • m

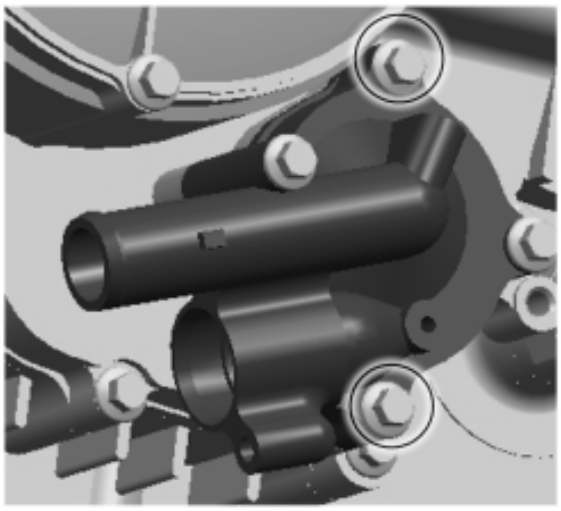


Water pump

●Install water pump.

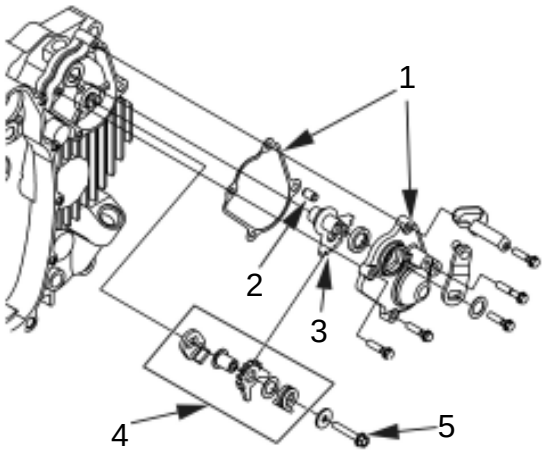
●Install water pump retaining bolts.

NOTE: Before tightening the bolts, be sure to insert oil pump shaft into groove of water pump shaft.



Sector gear

Install the parts as illustrated on the right.



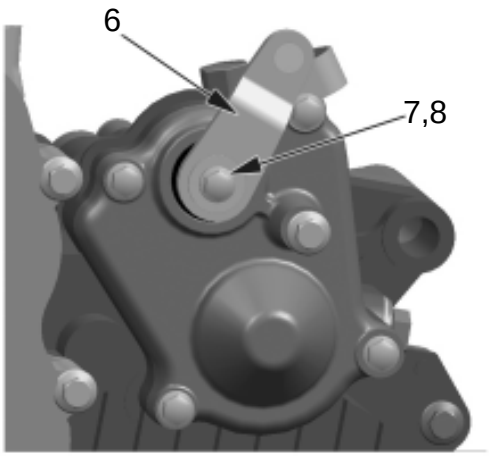
1-Sector gear cover and gasket
2-Dowel pin
3-Drive sector gear
4-Driven sector gear
5-Driven sector gear bolt

NOTE:
When the shift cam is in the neutral position, the mark of drive sector gear should be between the two marks of the driven sector gear

Driven sector gear tightening torque:14**N • m**

●Install gearshift rocker arm 6.

●Install rocker arm bolt 7 and washer 8.



Oil filter

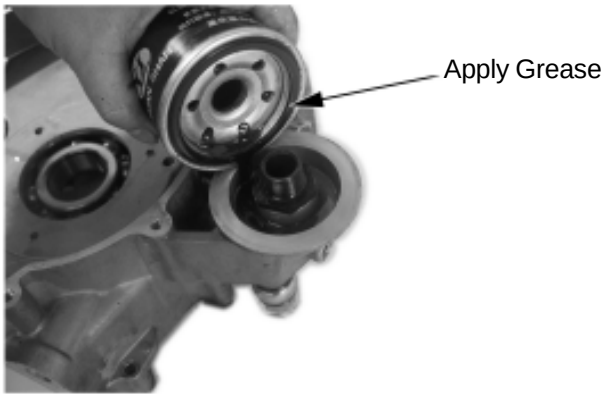
Install oil filter bolt and tighten to the specified torque.

Tightening torque:**63N • m**

●Apply engine oil to O-ring.

●Install oil filter, turn it by hand until the filter gasket contacts the mating surface. Tighten the bolts.

Tool:Oil filter wrench



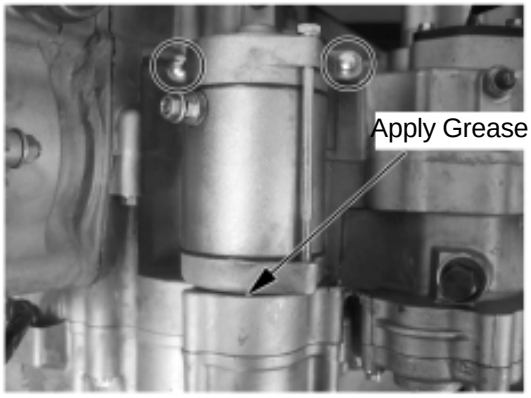
Starting motor

●Apply engine oil to new O-ring.

●Install starting motor.

●Install bolt and tighten to the specified torque.

Tightening torque: 10N.m



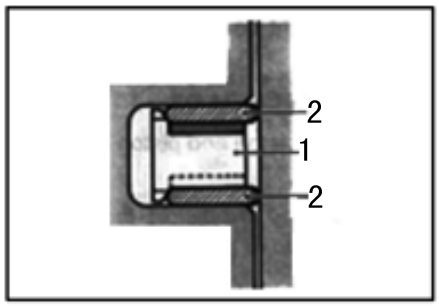
Engine top side

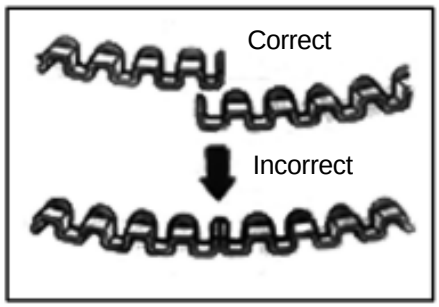
Piston

●Install the piston rings in the order of oil ring,2 ring and 1 ring.

●The first member to go to the oil ring groove is spacer 1, after placing the spacer, fit the two side rails 2.

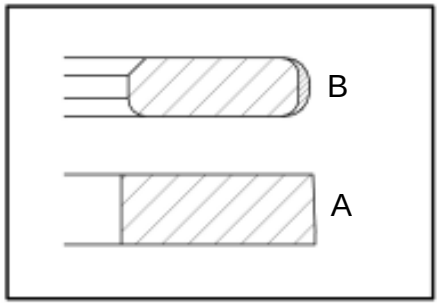
WARNING: When installing the spacer 1, do not overlap its two ends in the groove.



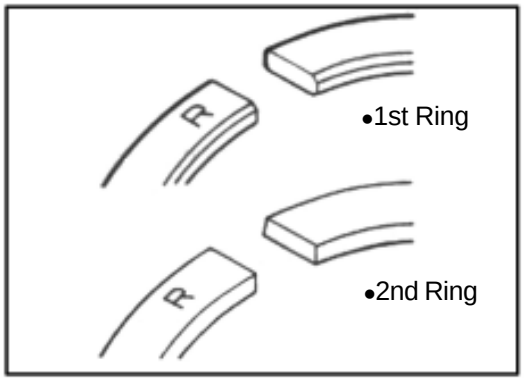


●Install the secong ring A and first ring B.

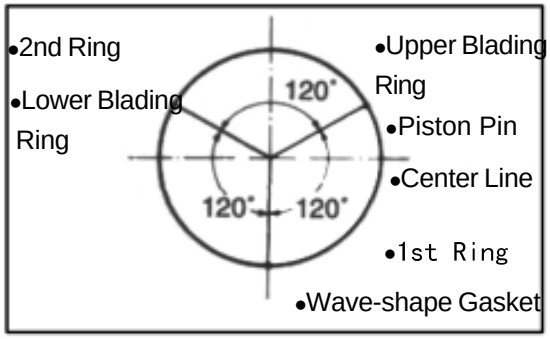
NOTE:1st ring and 2nd ring differ in shape.



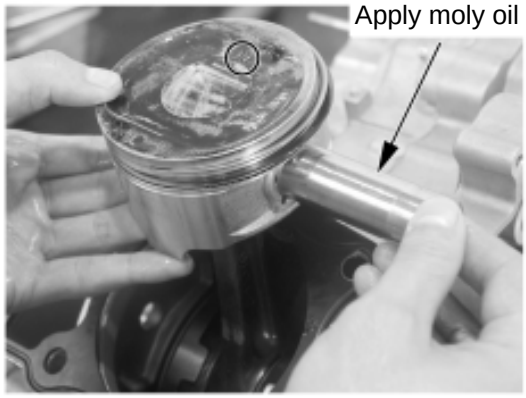
●1st and 2nd rings have letter R marked on the side. Be sure to bring the marked side to the top when fitting them to the piston.



●Position the gaps of the three rings as illustrated on the right. Before installing the piston into the cylinder, check that the gaps are so located.



●Apply a light coat of moly oil to the piston pin.

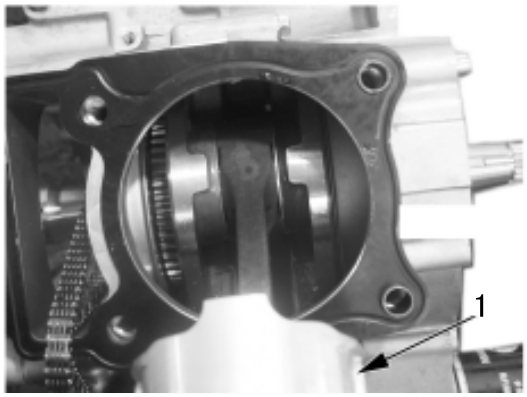


●Install piston pin into holes of piston and conrod small end.

NOTE: When installing the piston, the IN mark on piston top is located to the intake side.

●Place a clean rag beneath piston and install piston pin circlip 1.

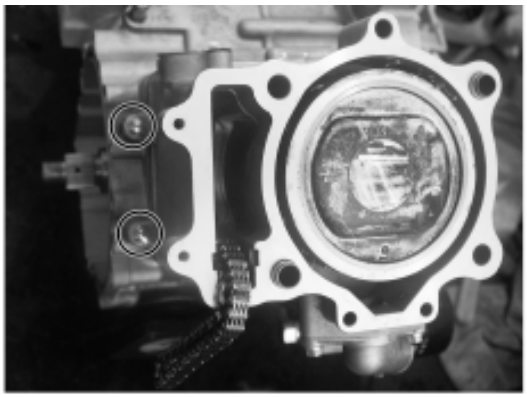
NOTE: while rotating crankshaft, pull the cam chain upward, or the chain will be caught between sprocket and crankcase.



●Install the dowel pins and the new cylinder gasket.

NOTE: Use a new cylinder gasket to prevent oil leakage.

Cylinder



●Apply engine oil to piston skirt and cylinder wall.

●Hold each piston ring with proper position, insert piston into the cylinder.

●Tighten the cylinder base bolts temporarily.

NOTE: When installing the cylinder and cylinder head, pull the cam chain upward, or the chain will be caught between sprocket and crankcase.

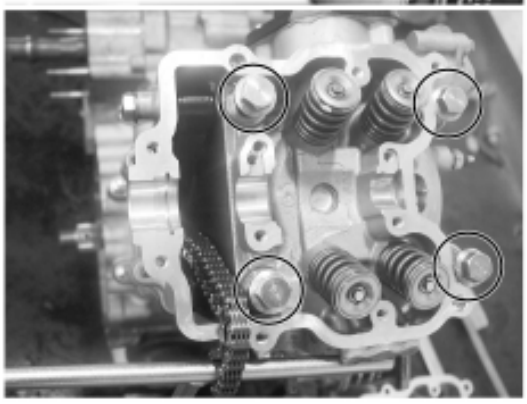
●Install chain guide 1.

●Fit the dowel pin and new cylinder cover gasket.

NOTE: Use a new cylinder cover gasket to prevent oil leakage.

Cylinder

●Install the cylinder cover, tighten the cylinder head bolts diagonally to the specified torque.



Cylinder head bolt tightening torque:

Initial:**25N • m**

Final:**46N • m**

●Tighten the cylinder head nuts to the specified torque.

Cylinder head nuts tightening torque:

M6: **10N • m**

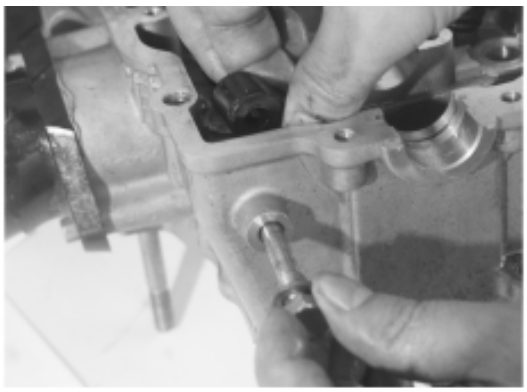
M8: Initial: **10N • m**

Final:**25N • m**

●Tighten the cylinder top nuts and cylinder base to the specified torque.

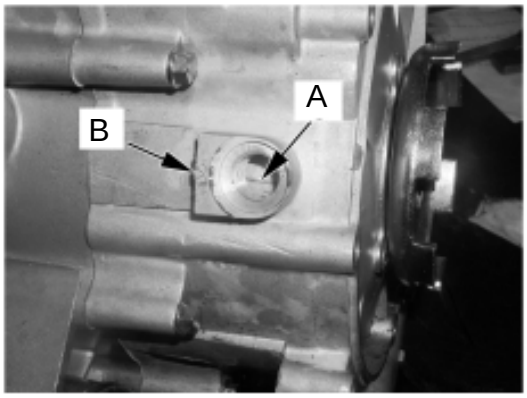
Tightening torque:**10N • m**

●Install chain tensioner.



Camshaft

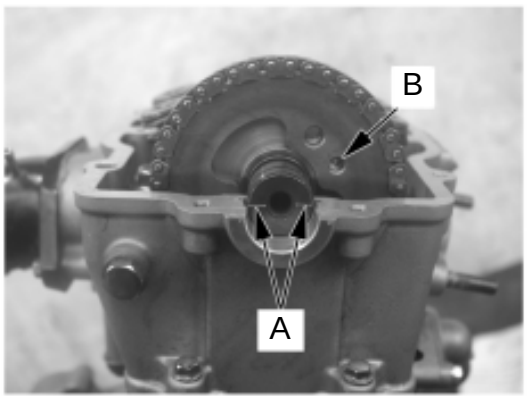
●Align mark A on magneto rotor with mark B on crankcase.



NOTE: While rotating crankshaft, pull the cam chain upward, or the chain will be caught between sprocket and crankcase.

●Align the mark A on the camshaft so that they are parallel with the mating surface of the cylinder head.

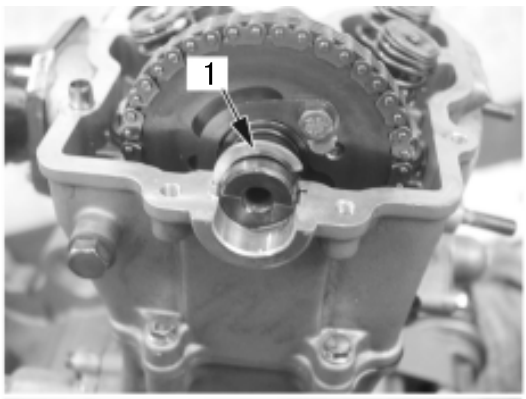
NOTE: Do not rotate the magneto rotor while doing this. when the sprocket is not positioned correctly, turn the sprocket.



●Engage the chain on the sprocket with the locating pin B as illustrated on the right.

●Recheck if the position of mark A and C is correct. If not, reassemble until it is correct.

●Install crankshaft C-ring 1.

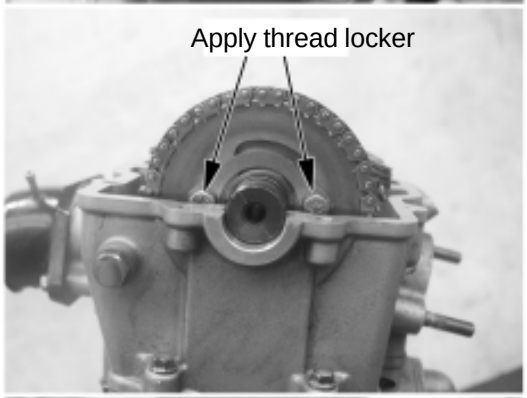


●Install lock washer so that it covers the locating pin.

●Apply thread locker to the bolts before installing, and tighten them to the specified torque.

Sprocket bolt tightening torque:**15N • m**

●Bend up the lock washer to lock the bolts.

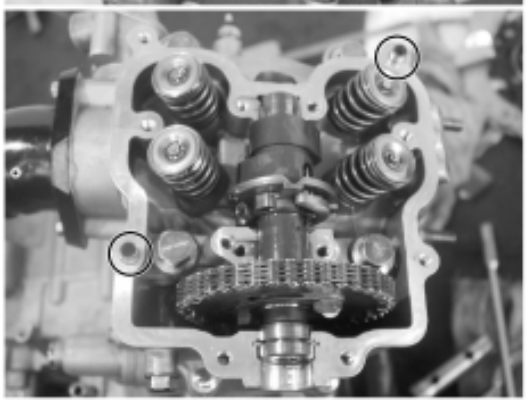


Cylinder head cover

●Clean the mating surface of cylinder head and cylinder head cover.

●Install dowel pin to the cylinder head.

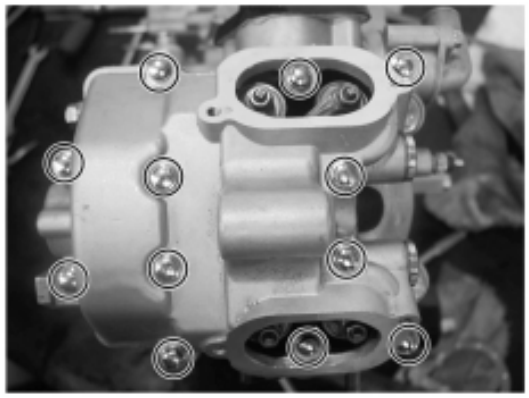
●Apply sealant to the mating surface of the cylinder head cover.



●Install cylinder head cover bolts, tighten diagonally to the specified torque.

Cylinder head cover bolt tightening torque: **10N • m**

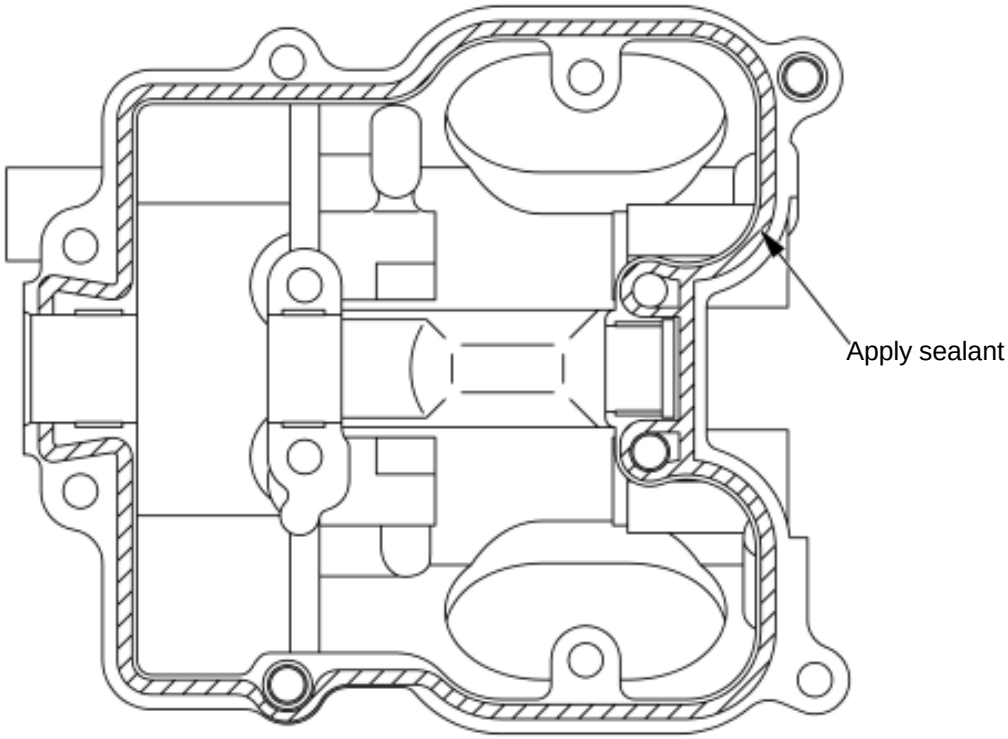
NOTE: When tightening the cylinder head cover bolts, the piston must be at top dead center on the compression stroke.



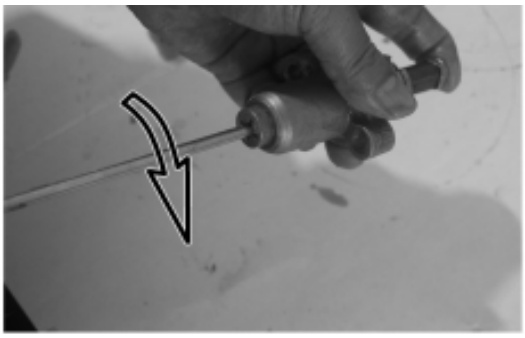
6

CFMOTO

Gasket sealant applying place



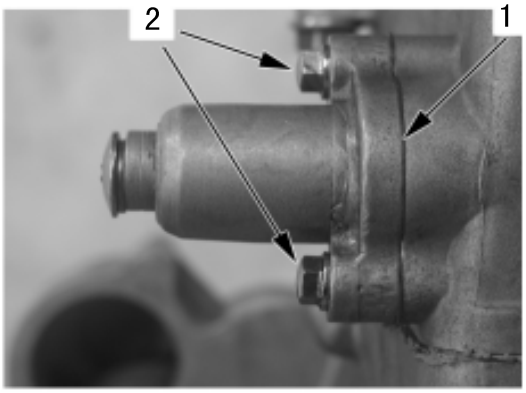
Chain tensioner



●Insert (--) screwdriver into slotted end of chain tension adjuster, turn it clockwise to lock the tensioner spring.

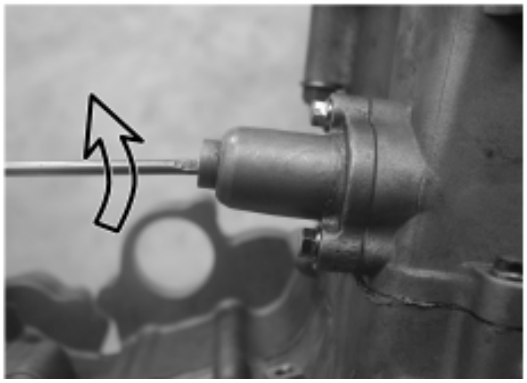
●Install the chain tensioner and the new washer 1.

●Install the bolt 2, tighten it to the specified torque.



Chain tensioner bolt tightening torque:10N • m

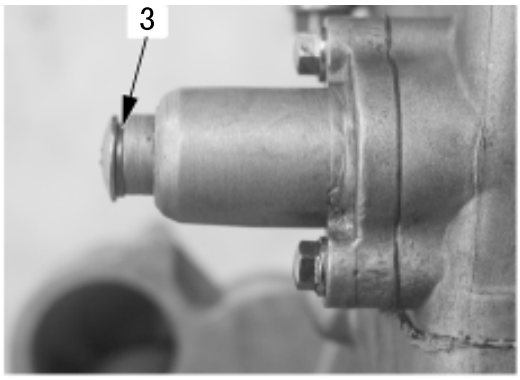
●After chain tensioner is installed, turn the (--) screwdriver counter clockwise. The tensioner rod will be advanced under spring force and push tensioner against chain.



●Install the new gasket 3.

●Install chain tensioner screw, tighten it to the specified torque.

Chain tensioner screw tightening torque:**8N • m**



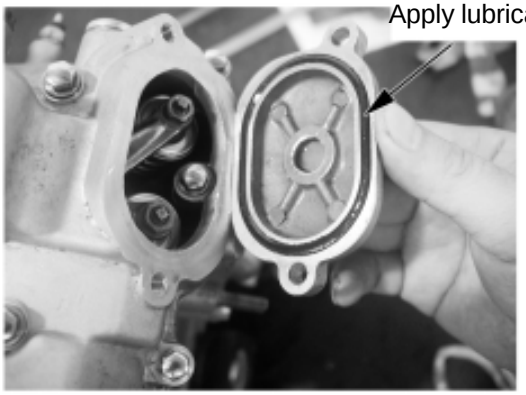
Valve adjuster cover

●Refer to 2-3 for valve clearance.

●Use new rubber gasket and apply grease.

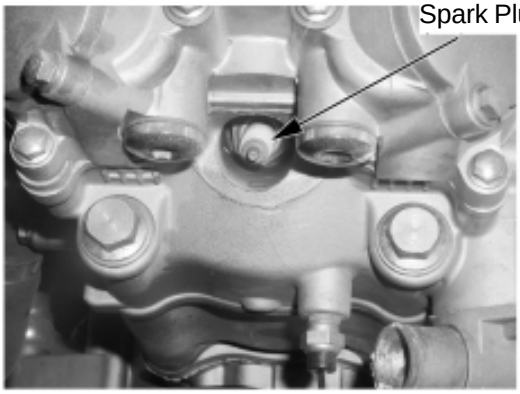
●Install Valve Inspection Cap.

●Install valve inspection cap bolt.



Spark plug

●Install spark plug with special tool and tighten to the specified torque.



NOTE: To avoid damage to the cylinder head thread, screw in the spark plug with hand first, then tighten it to the specified torque with spark plug wrench.

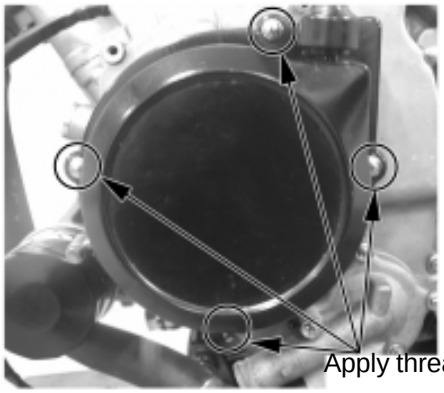
Spark plug tightening torque:18N. m
Tool: Spark Plug Wrench

Engine periphery

Recoil starter

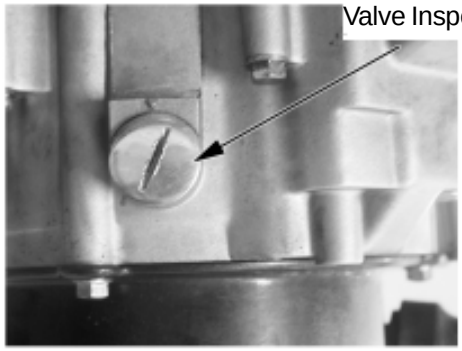
●Install recoil starter.

●Apply thread locker to the bolts and then tighten.



Valve inspection cap

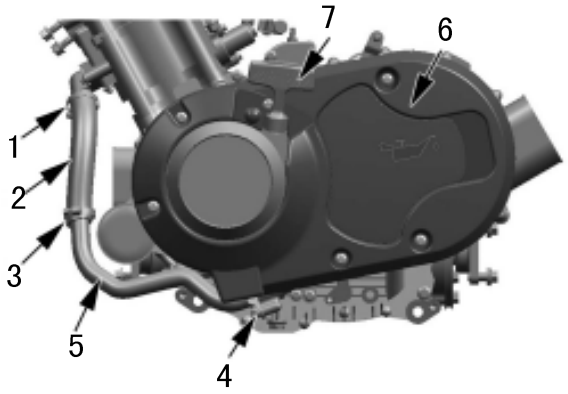
●Install valve inspection cap.



Left plastic cover

●Install left plastic cover 6.

Water pipe and hose



- Install water hose 5.
- Install bolt 4.
- Install water hose 3.
- Install clamp 1,2.

Overhaul Info

CAUTION

NOTE

Gasoline is highly flammable, therefore smoke and fire are strictly forbidden in the work place. Special attention should also be paid to sparks. Gasoline may also be explosive when it is vaporized, so operation should be done in a well-ventilated place.

- Do not over twist or bend the cables. The twisted cables may cause poor operation.
- Loose the high pressure fuel line before disassembly, discharge the fuel in the high pressure fuel line and put it in a container.
- When the body of throttle valve is disassembled, the air intake shall be covered by dishcloth or tape, for avoiding the entry of other objects into the engine from the air intake side of the engine.
- When the vehicle will be stored for more than one month, the gasoline in the high pressure fuel line and cap of the fuel injector must be discharged. Otherwise, the gasoline will age and form colloidal elements which may block the nozzle of fuel injector, therefore the engine cannot start or the rotate speed is unstable.

Overhail Info

Engine Starting Failure

- Too much fuel in the engine.
  -Ail filter clogged.
  -Idle air pipe clogged.
- No fuel in the injector.
  -Fuel filter clogged.
  -High pressure fuel line clogged.
  -Fuel injector clogged.

Hard Starting/Stall After Starting,Unsteady Idle Speed

- Idle air pipe clogged.
- Fuel system clogged.
- Ignition system not functioning properly.
- Fuel tank cap clogged.

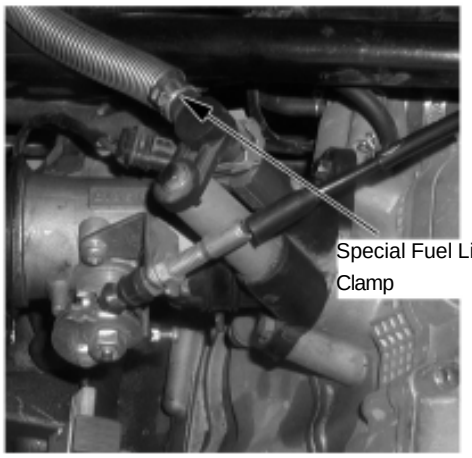
Stall When Accelerating

- Ignition system not functioning properly Incorrect spark plug clearance.

High Pressure Fuel Line Disassembly

Loosen the special fuel line clamp on fuel injector cap.
loosen the special fuel line clamp on fuel tank.
Disassemble High pressure fuel line.

NOTE:Use container to keep the remaining fuel from high pressure fuel line, when loosening the special fuel line clamp

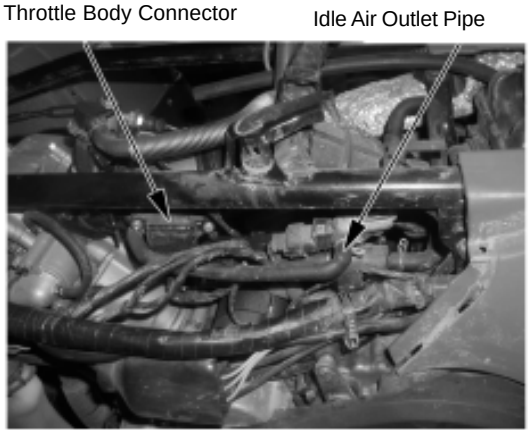


High Pressure Fuel Line Installation

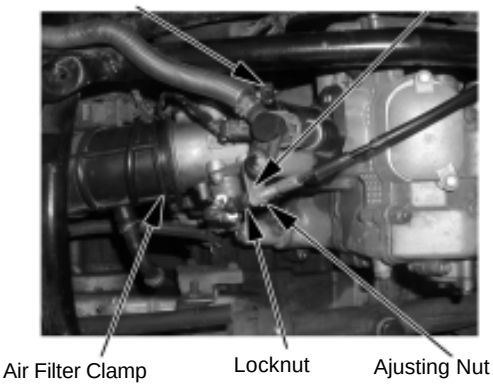
Reverse the disassembly procedure for installation.
Use OETIKER clamp calliper to install the special fuel line clamp.

Throttle Body Disassembly

Loosen the strap and remove throttle valve connector.
Loosen locknut, remove adjust nut and remove the throttle cable from throttle rotory sleeve.
Disassemble idel air outlet pipe on throttle valve.
Loosen air intake connect clamp, air cleaner connect clamp, and remove throttle valve body.

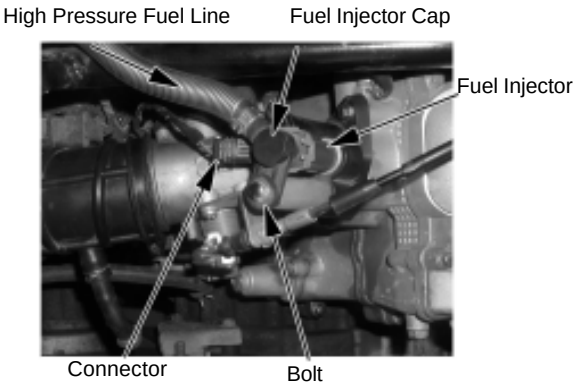


NOTE: Do not adjust the bolt on throttle body.
Do not remove the cap on throttle body.



Throttle Body Installation

Reverse the disassembly procedure for installation.



Fuel Injector Assy Disassembly

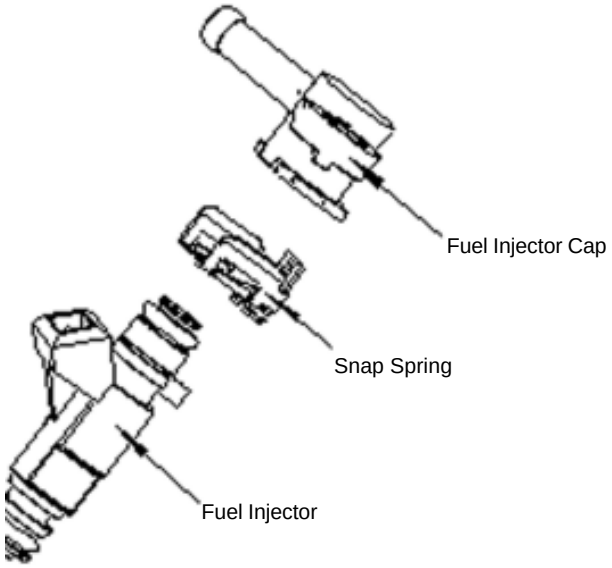
Disassemble the special high pressure fuel
Remove the strap and fuel injector connector.
Disassemble bolts and remove fuel injector cap and injector.

Fuel Injector Assy Installation

Reverse the disassembly procedure for installation.

Fuel Injector Assy Removal

Use thumbs of both hands to push two sides of fuel injector cap snap spring, and then remove it.
Seperate fuel injector cap and fuel injector.

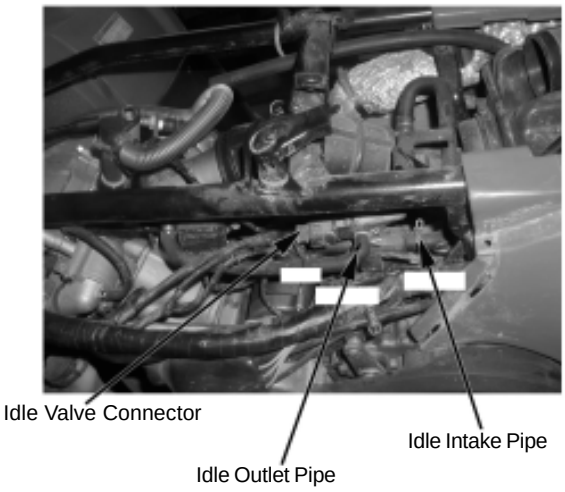


Fuel Injector Assy Assembly

Install fuel injector cap on the fuel injector,
Align the groove of fuel injector cap snap spring to the edge of fuel injector cap;and press the snap spring into it.

Idle Air Control Valve Disassembly

Disassemble idle intake pipe and idle outlet pipe.
Loosen the strap, disassemble idle air control valve and check idle air control valve.
Replace it when there is abnormal noise or it doesnot work.



Idle Air Control Valve Installation

Reverse the disassembly procedure for installation.
Pay attention not to bend the intake and outlet pipe of idle air control valve.

Overhaul

Operation Notice

Attention

- The frame must be hold up firmly when overhauling front wheel, suspention system.
- Light,meter,switch overhaul or inspection refers to section10.
- Do not overpower on the tire, be careful not to destroy the tire.
- When disassemble the tire on the rims, to avoid destroy the rim, you required to use special tire-lever and rim-protector.

Overhaul standard

Item			Standard	Service limits
	Rim jump	Portrait	0.8mm	2.0mm
		Cross	0.8mm	2.0mm
	Tyre	Remain groove	—	3.0mm
		Air pressure	35kPa（0.35kgf / cm^2）	—
Front disc	Brake lever windage		0mm	—

8

Tightening torque

Steering tie-rod nut: 40-50 **Nm**
Steering shaft lock nut: 100-120**Nm**
Front wheel shaft nut: 110 **Nm**
Suspension fixed bolt/nut: 40-50 **Nm**
Rim install nut: 50-60 **Nm**
Rim shaft nut: 110-130 **Nm**

Special Tools:

Bearing Disassemble Tooling Bar
Bearing Disassemble Tooling Nod 10mm
Press In Tooling Lever A
Press In Tooling Coat 28 × 30
Guide Tool 10mm
Lock Nut Spanner
Bearing Disassemble Tools
Rotor Puller
DisassembleTooling Bar
Disassemble Heavy Punch
Assemble Tooling Bar

Fault Diagnosis

Handlebar Heavy

- Upper screw over tightened.
- Steering shaft worn or damaged.
- Bearing inner, external race destroy, worn, step.
- Steering column deformed or bent.
- Tire pressure incorrect.
- Tire worn out.

Handlebar Shake

- Steering shaft destroy,bad tightening.
- Left and right absorber unmatch.
- Tire deflection.
- Frame deformed or bent.
- Tire destroyed.
- Wheel shaft damaged or bent.

Front Wheel Jump

- Rim deformed or bent.
- Wheel shaft bad.
- Tire bad.
- Wheel out of balance.
- Wheel shaft round bad tightening.

Wheel Rotation Dumb

- Wheel shaft bad.
- Front wheel shaft bent.
- Brake drag.

Front Suspension Too Soft

- Front suspension bounce weaken.
- Tire pressure too low.

Front Suspension Too Hard

- Front suspension bent.
- Tire pressure too high.

Front Suspension Abnormal Noise

- Front suspension bad.
- Suspension tightening parts loosen.

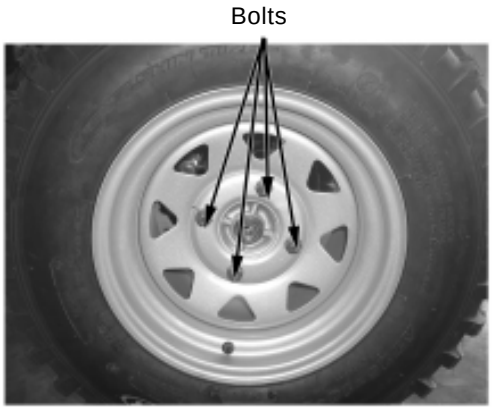
Brake Effet Poor

- Brake adjustment bad.
- Brake disc surface damaged.
- Brake pads worn out.

Front wheel

Disassemble

Set up front wheel with tool, ensure without any force on the front wheel.
Remove steer cap.
Remove the four nuts installed in the front wheel hub,
Remove front wheel.



Inspection

Rim

Inspect the rim for damage, replace the rim if needed.

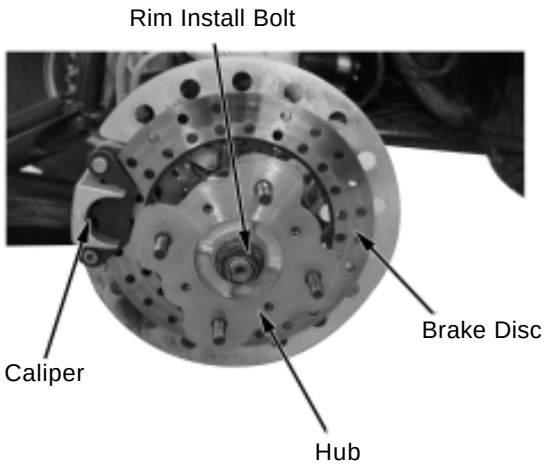
Turn the wheel slowly, use centimeter measure rim jump.

Service limit:axial direction: 2.0mm

Radial direction:2.0mm

Installation

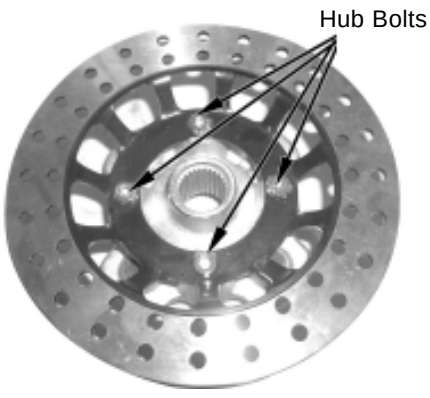
Press the rim in the tire on special matchin.
Fix the rim in hub
Rim install nut torque:50-60 Nm



Front Wheel Hub Disassemble

Disassemble

Remove front wheel (→8-3).
Remove front brake caliper (→8-4).
Remove rim shaft nut.
Take away brake disc and hub together.
Remove front brake disc 4pcs brake bolts.
Remove front wheel hub.



Installation

Installing carry on according to the opposite sequence.

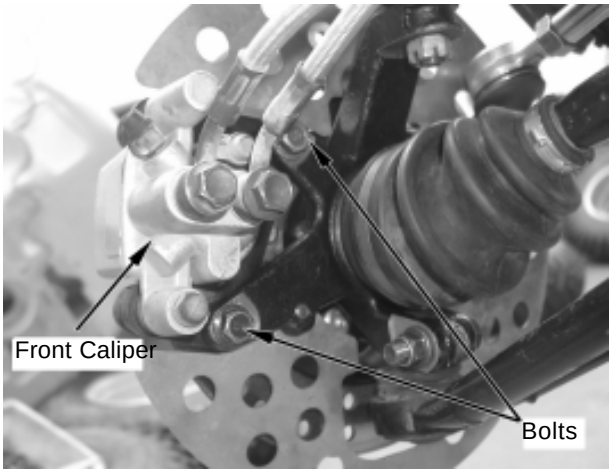
Hub bolt torque :110-130 Nm

Brake System

Front Brake Caliper

Disassembly

Remove front wheel（→8-3）.
Remove the 2pcs nuts installed on the arm
Remove brake caliper.



Inspection

Check if the brake caliper crack is cracked,
if the tightening area oil leakage,
replace if needed.

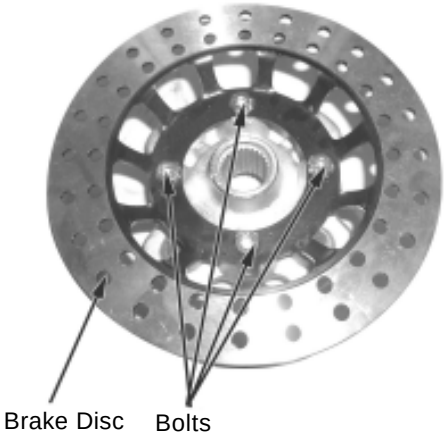
Installation

Brake caliper holding bolt torque:40-50Nm

Brake disc

Disassemble

Remove front wheel(→8-3).
Remove brake caliper （→ 8-4）
Take away brake disc together with front wheel hub.
Remove brake disc's 4pcs nut installed in front wheel hub.
Remove the brake disc.



Inspection

Brake disc thickness: replace when less than 2.5mm.

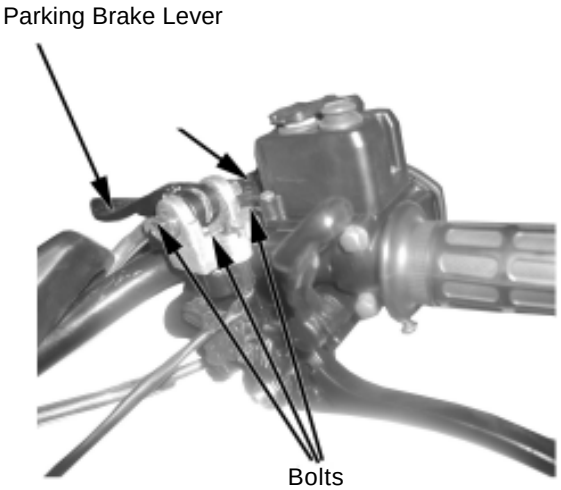
Installation

Install the brake disc well
Brake disc holding bolt torque:25-30Nm

Hand Brake Master Cylinder,Front Brake

Disassemble

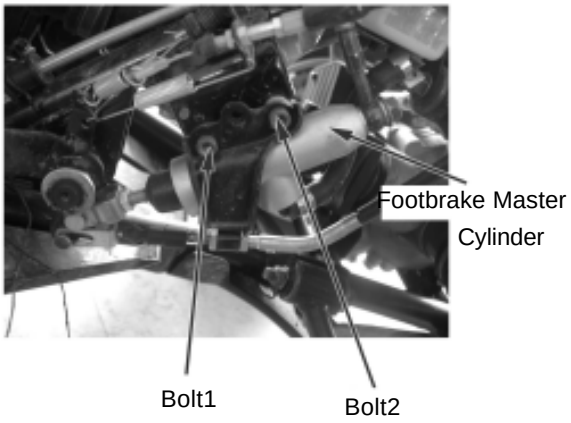
Remove bolt.
Remove parking lever.
Seperate front hand brake master cylinder handlebar.
It is not necessary to remove the front hand brake master cylinder if not replace the brake pump assembly.



ATTENTION:Do not use brake tube hang the brake pump,to prevent front hand brake master cylinder backdate,so keep installing position, at the same time, fix it in the handlebar.
Brake hose routing trend according to Sction 1 cable, wire traces.
Must keep the brake hose routed correctly.
Complete the brake system installation,brake effort must be checked.

Disassembly

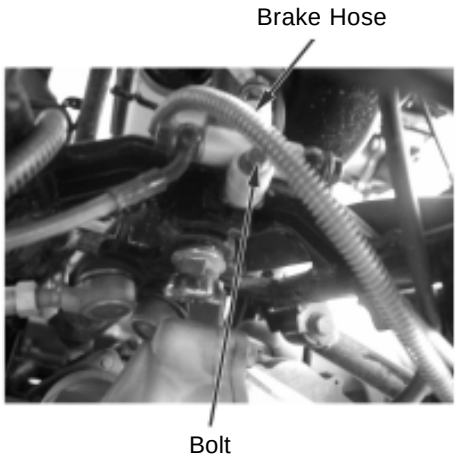
Remove foot rest（→2-9).
Remove front inner fender RH（2-12).
Remove bolt1, bolt2.
Seperate pedal brake master cylinder from the body.



Assembly

For assembly,reverse the disassembly procedure.

ATTENTION:
To avoid air into the brake pump, thus you must to keep the assemble position, at the same time, fix it in the vehicle body.
Brake hose trend refers to Section1 cable, wire traces. It must ensure the brake hose routing . After complete the brake system installation, checking the brake effort is required.



Brake Y-joint

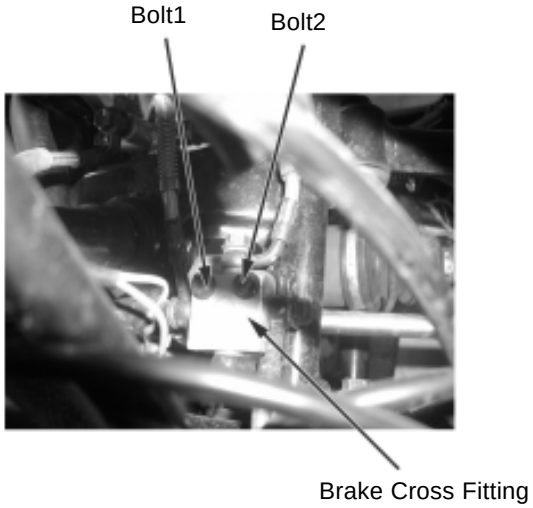
Disassembly

Remove front inner fender RH（2-12）
Remove bolt 1 then the brake Y-joint canbe remove form the body.

Assembly

For assembly,reverse the disassembly procedure.

ATTENTION:Brake hose routing refers to section 1, cable and wire routing, the brake oil line must be smooth.
Brake force checking is required when complete the brake system installation. If it cannot gang control the brake system, check if the stem T-junction, brake force checking is required after finish the brake system installation.



Brake Cross Joint Plug

Disassembly

Remove front inner fender RH（2→12).
Remove bolt 1, bolt 2, then the cross joint plug canbe remove from the body.

Assembly

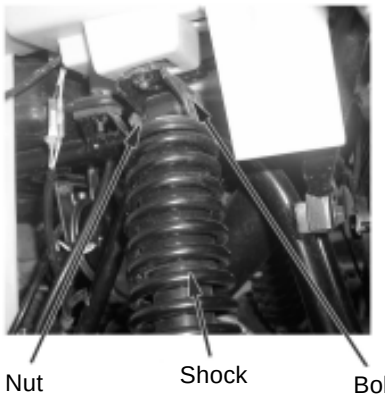
For assembly,reverse the disassembly procedure.

ATTENTION:Brake hose routing refers to section 1 cable, wire line traces, brake oil line must be smooth.
Brake force checking is needed after finish the brake system installation, if it cannot join control, check the cross plug.

Front Suspension System

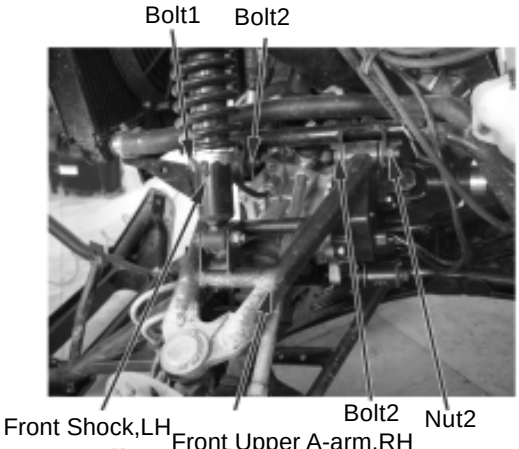
Front Left Suspension assemble

Attention: when repairing suspension, you must not remove both LH and RH suspension at one time, or else the body will fall down because lack of holding power.



Disassembly

Put vehicle body into horizontal position, use jack hold the wheel front firmly.
Remove front wheel (→8-3).
Remove front rim hub (→8-3).
Remove caliper (→8-4).
Remove front left absorber bolt 1 and tightening nut 1 installed on the body.

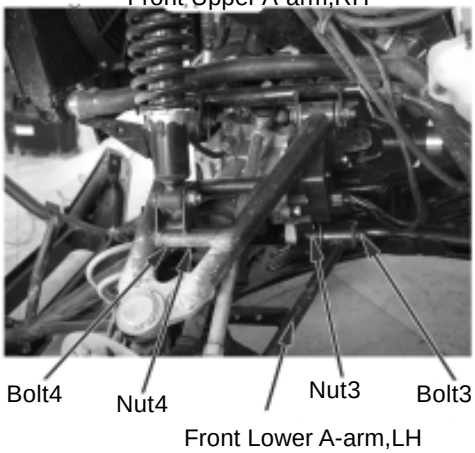


Remove front left upper arm bolt 1 and tightening bolt 1,nut 1; bolt 2 and bolt 2, nut 2 installed in the frame.

Remove front left lower arm bolt 3 and tightening bolt 3's nut 3, bolt 4 and tightening bolt 4's nut4 installed in the frame.

Remove steering tie-rod ball pin slot nut, remove the steering pie-rod

Pull up joint knuckle from the driveshaft, remove front left suspension assy.



8

1.Bolt GB5789 M10 × 1.25 × 10 13.Brake Disc Guard 26.Dust Boot Set,Fixed End

2. Bolt GB5789 M10 × 1.25 × 70 14.Bolt:GB5789 M6 × 12 27.Small Clamp

3.Front Shock Absorber Assy 15.Circlip 28.Front Shaft,LH

4.Nut:GB6187 M10 × 1.25 16.Bearing,Hub 29. Dust Boot Set,Front Motion End

5.Cap,Buffering Collar 17.Buttom Ball Pin 30.Front Lower Arm,LH

6.Buffering Collar 18.Cotter Pin 31.Bearing Set,Motion End

7. Cap,Buffering Collar 19.LH Steering Knuckle 32.Big Clamp,Motion End

8.Front Upper Arm,LH 20.M6 Nut Clamp 33.Wire Clamp II

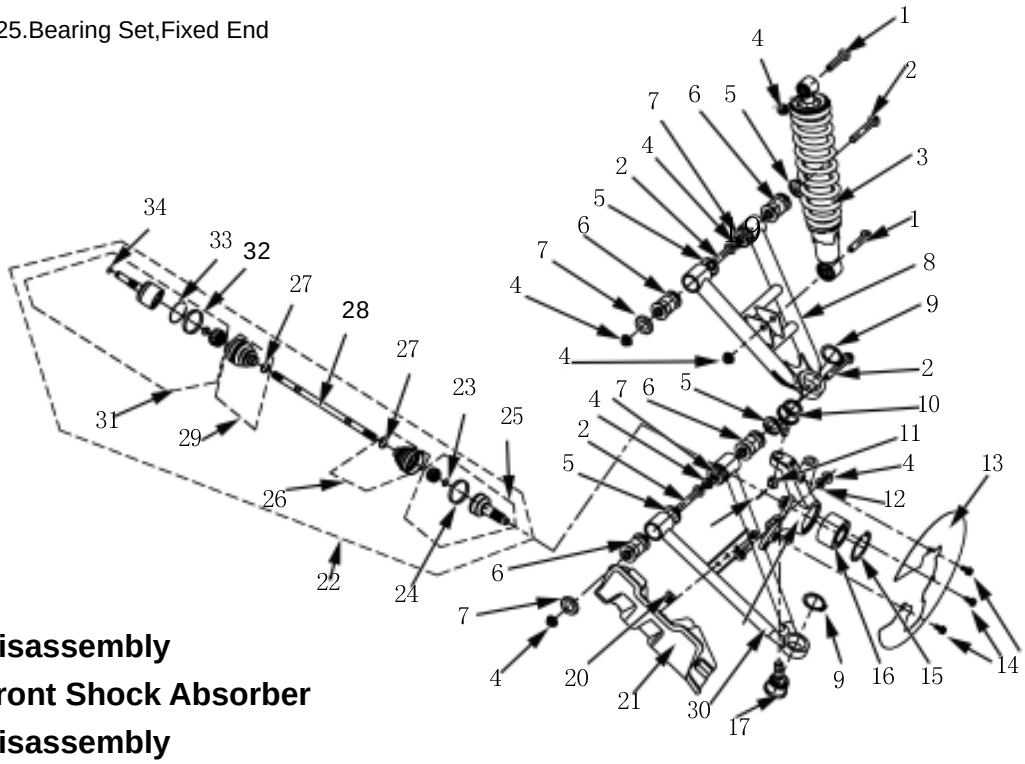
9.Circlip 21.Front Protector,LH 34.Wire Clamp

10.Top Ball Pin 22.Front Axle,LH

11.Slot Nut 23.Wire Clamp

12. Φ 10 Washer 24.Big Clamp,Fixed End

25.Bearing Set,Fixed End



Disassembly

Front Shock Absorber

Disassembly

ATTENTION:You do not need to remove any other parts if you only replace the front suspension.

Remove front left shock absorber's bolt 1,nut 1 installed in arm.

Remove front right shock absorber.

Inspection

Inspect the shock for oil leakage, oil seal damage, destroy, replace if needed.

Assembly

For assembly,reverse the diassembly procedure.

Front left shock absorber disassembly, assembly, inspection are as same as front right shock absorber.

Arm Assembly

Attention:There are 8 suspension arms in the vehicle, they dismantle,inspection and assemble in the same way.So here only introduce the way to dismantle,inspection and assemble the front left upper arm and the front right lower arm. Other arm assemble refers to the above.

Front RH Arm Assy

Disassembly

Remove front right absorber (→6-8)
Remove front right upper arm's bolt 3 and tightening nut 7, bolt 1, tightening bolt 1 and nut 7.

Remove front right lower arm's bolt 3 and tightening bolt 7's nut 7 installed in the frame.
Before disassembling the shock absorber, you have to remove the wheels, brake caliper and rim hub.
Before disassembling the bolts, you need to remove the steering tie-rod.
Before disassembling front right lower arm assy, you need to pull up the knuckle from the driveshaft.

Remove front right arm assy.

Inspection

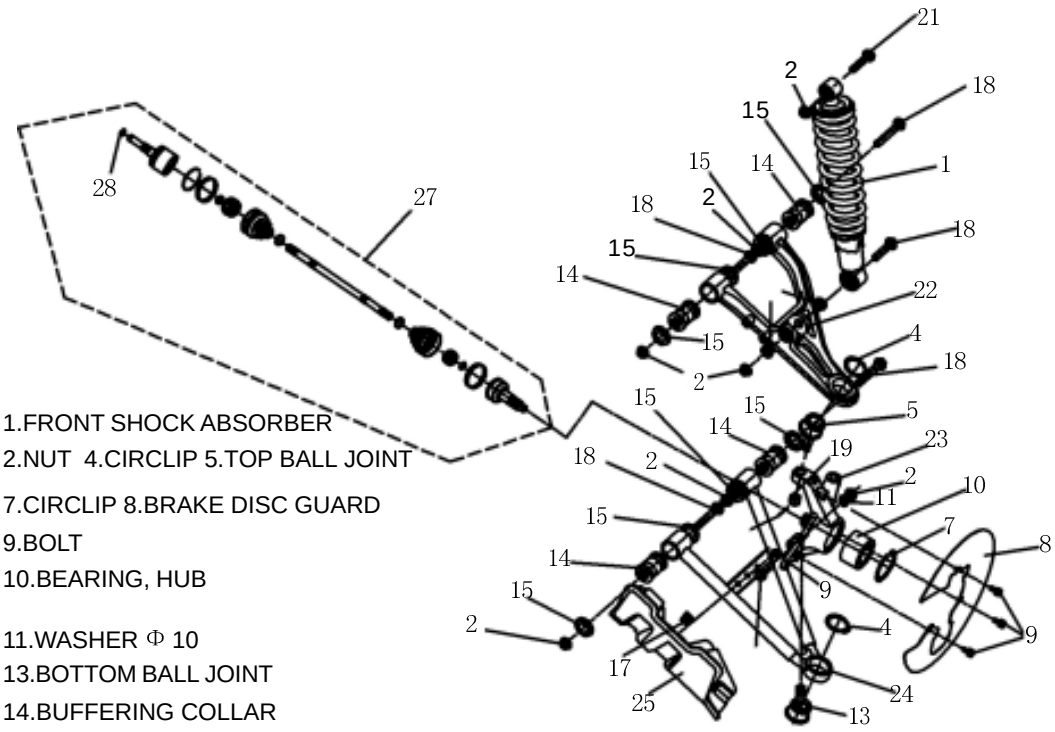
Ball Joint

Inspect if it can rotate flexibly between top ball joint 5 and front left upper arm 22,bottom ball joint 13 and front left lower 24. Besides, the gap between top ball joint and bottom,if it cannot move freely or the gap too big, ball joint replacement is needed.

Right Knuckle

Inspect the right knuckle for damage, replace it if needed.

Inspect if the rim shaft inside right knuckle moves freely, replace bearing if needed.



1.FRONT SHOCK ABSORBER
2.NUT 4.CIRCLIP 5.TOP BALL JOINT
7.CIRCLIP 8.BRAKE DISC GUARD
9.BOLT
10.BEARING, HUB
11.WASHER Φ 10
13.BOTTOM BALL JOINT
14.BUFFERING COLLAR
15.CAP, BUFFERING COLLAR
17.NUT CLAMP, M6
18.BOLT
19.SLOT NUT
20.COTTER PIN
21.BOLT
22.FRONT LEFT ARM (UPPER)
23.STEERING KNUCKLE ,LH
24.FRONT LEFT ARM (LOWER)
25.FRONT PROTECTOR (LEFT)
26.SHOCK SPACER
27.Front Axle,LH
28.WIRE CLAMP

Front Axles

Attention:For this vehicle, inspection,disassembling and assembling the front&rear axles are in the same way.Below introduces how to disassemble,inspect,assemble front axle,LH.

Front Axle,LH

Disassembly

Attention:You do not need to remove the front suspension assy from the vehicle if you only repair the front axle , LH.

Remove front wheel,LH (→8-3)
Remove front brake caliper,LH (→8-4)
Remove fornt rim hub,LH (→8-3)
Examine dust boot, replace with new one if damaged.

Shake the front axle,LH,inspect if the universal joint moves freely, the bearing move freely.
Replace with new ones if abnormal sound or play is found.

Attention:Double offset universal joint must can be move freely, otherwise,it cannot control the tires and result in accident.

8

Assembly

Use special tool to press the ball joint into the arm assy.
For assembly,reverse the disassembly procedure.

Attention: Replacement is required if the right&left arm shake after installation.

Mounting torque:40-50Nm

Steering System

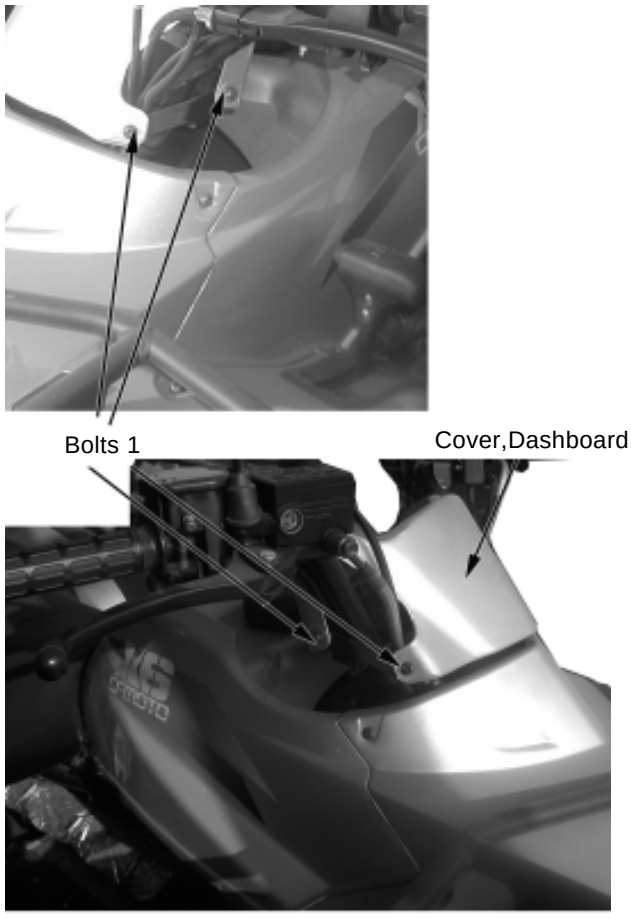
Handlebar

Dashboard cover

Disassemby

Remove dashboard cover bolt1.

Remove dashboard cover.



Assembly

For assembly,reverse the disassembly procedure.

RH Handlebar Switch

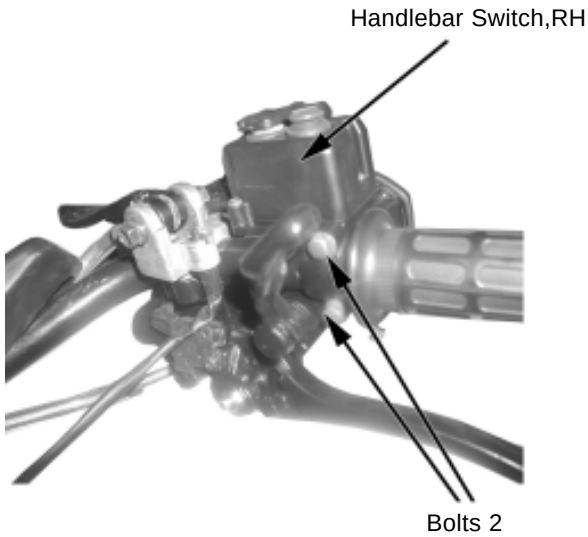
Disassembly

Remove front top cover（→2-4).

Remove RH handlebar switch connector.

Remove the two bolts installed in handlebar tube.

Remove handlebar switch, RH.



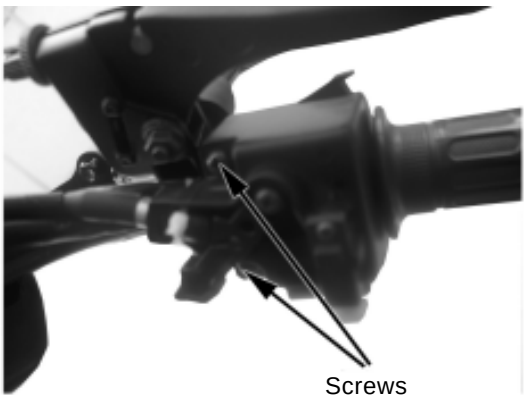
Installation

Install the handlebar switch, RH（→8-15).

Handlebar Switch, LH

Disassembly

Remove 2 screws.

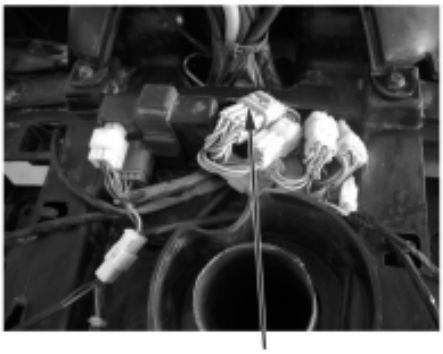


Screws

Remove LH handlebar switch connector.
Remove handlebar switch, LH.

Install

Install the LH handlebar switch（→8-15）



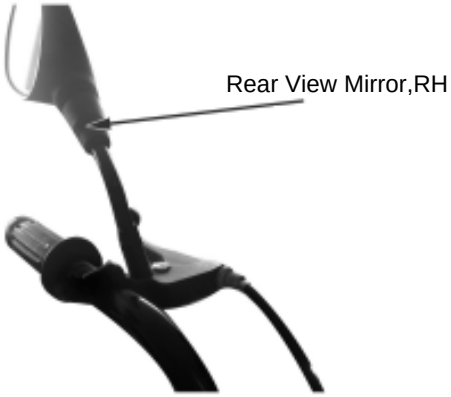
Connector,Handlebar Switch

Rear View Mirror

8

Disassembly

loosen the nut in counter-clockwise direction, then turn the rear mirror in counter-clockwise and you can take off the rear view mirror.



Rear View Mirror,RH

ATTENTION:Left hand rear view mirror is right hand screw thread, turn it in counter-clockwise direction when dismantling.

Loosen the nut in clockwise direction, turn the RH rear view mirror then you can take down the RH rear view mirror.

ATTENTION: RH rear view mirror is left hand thread, you required to turn it in clockwise direction when take it down.

Installation

For installation,reverse the disassembly procedure.

Handlebar Pipe

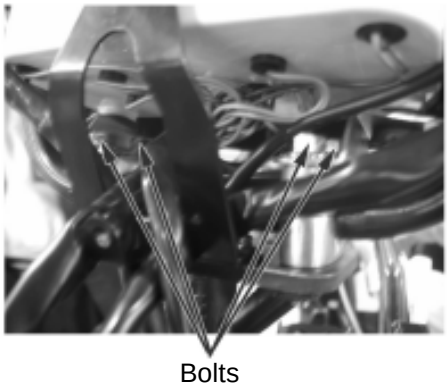
Disassembly

Remove the dashboard cover（→8-12）

Remove RH&LH handlebar switch（→8-12）

Seperate the right and left brake pump from the hanlebar pipe.

Remove the four installation bolt, take down the handlebar.



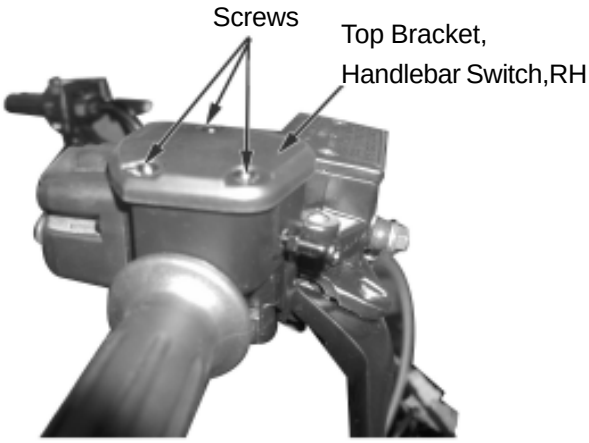
Assembly

For assembly,reverse the disassembly procedure.

Torque:20-30Nm(2.0-3.0kgf • m)

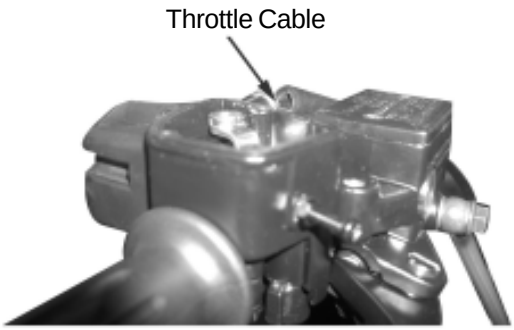
ATTENTION:

Main cable assy,throttle cable,brake hose must route correctly.



Install Throttle Cable

Remove the three screws, remove RH handlebar switch cover.

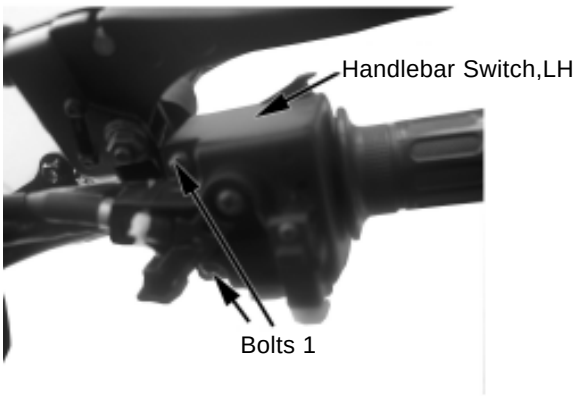


Install throttle cable

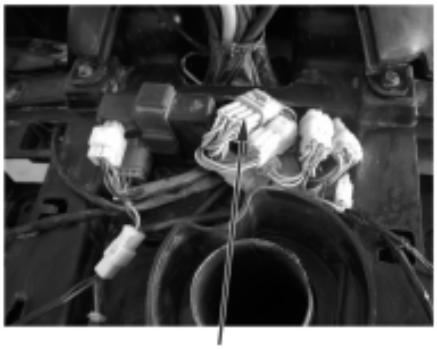
install RH handlebar switch cover.

Install LH Handlebar Switch

Pair the LH handlebar switch stopped onto the handlebar location hole.
use bolt 1 tightening from the bottom.

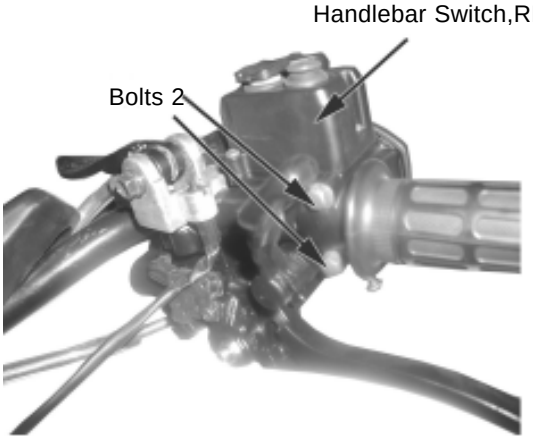


Insert the LH handlebar switch's connector into the main harness.

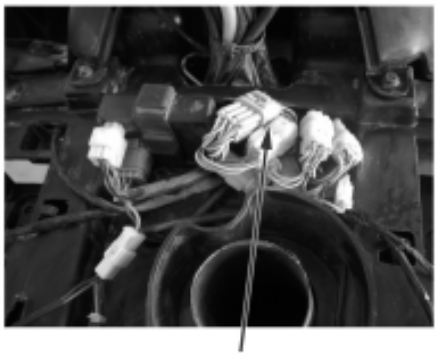


Install RH Handlebar Switch

Install the RH handlebar switch stopped onto the handlebar location hole. Tightening through the bolt 2 from the bottom.



Insert the RH handlebar switch's connector into main harness.

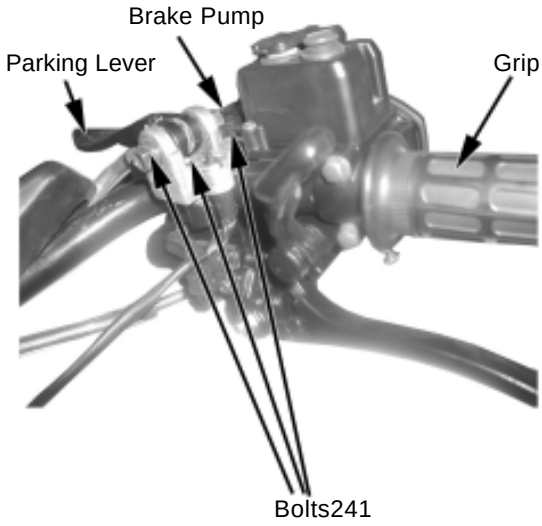


Install RH&LH Grip

Clean inner LH grip and dry it. coat the connection with joint cement between handlebar and LH grip, put in the RH&LH grips.

ATTENTION:

The installed RH&LH grips must be placed for hours for dry the joint cement.



Install Brake Pump

Install brake pump with “up” mark facing up.Make sure the distance between brake pump and handlebar switch us equal.

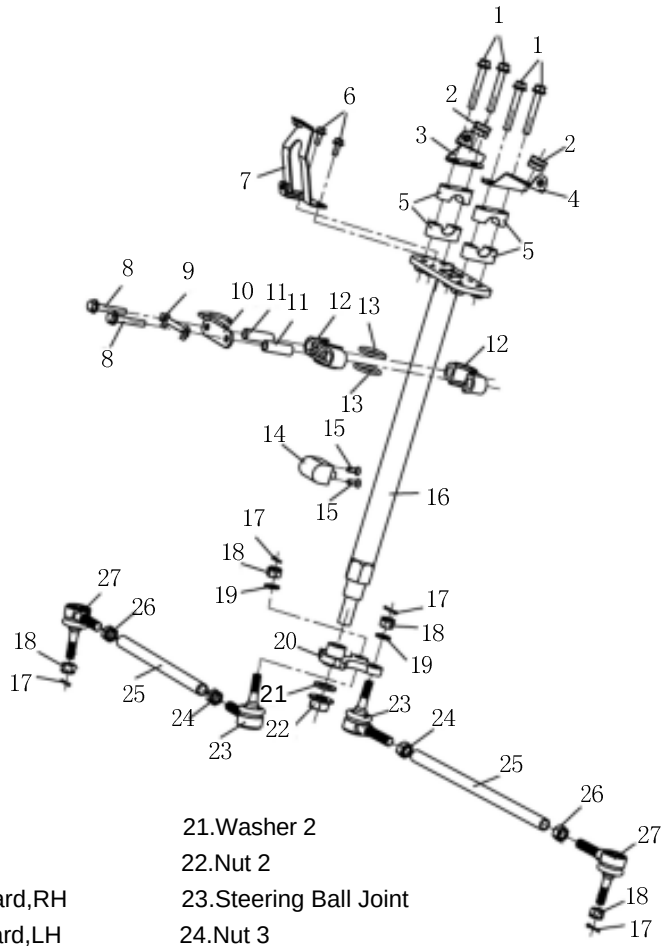
ATTENTION:

Main cable assy,throttle cable, brake hose must route correctly.

Install Parking Lever

Install the rear view mirror（→8-13）
Install the dashboard（→8-10）
Install the dashboard cover（→8-12）

Steering System

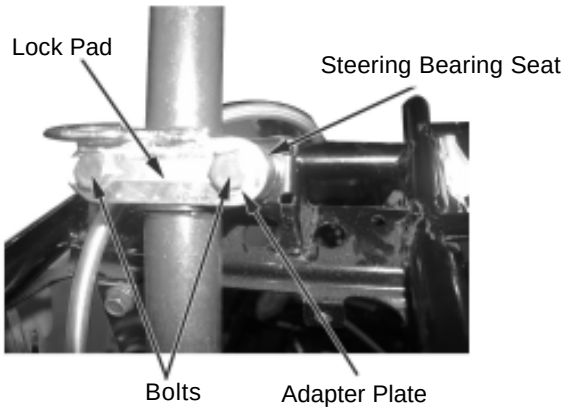


1.Bolt1
2.Rubber Collar
3.Bracket Dashboard,RH
4.Bracket Dashboard,LH
5.Aluminum Cover,Handlebar
6.Bolt2
7.Front Bracket,Dashboard
8.Bolt3
9.Lock Pad
10.Adapter Plate
11.Bush
12.Bushing,Steering Column
13.Seal Ring
14.Steering Lock
15.Screw
16.Steering Column
17.Cotter Pin
18.Nut 1
19.Washer 1
20.Pitman Arm
21.Washer 2
22.Nut 2
23.Steering Ball Joint
24.Nut 3
25.Tie-rod
26.Nut 4
27.Steering Ball Joint

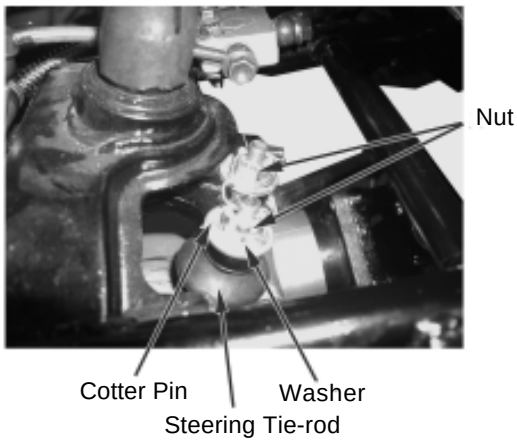
Steering Column

Disassembly

Remove dashboard front cover（8-12）.
Remove front wheel（→8-2）.
Unhook handlebar switch connector.
Use straight screwdriver and hammer ,bend out the lock pad.
Remove bolt1,bolt2.
Remove steering column seat, plate and bush.

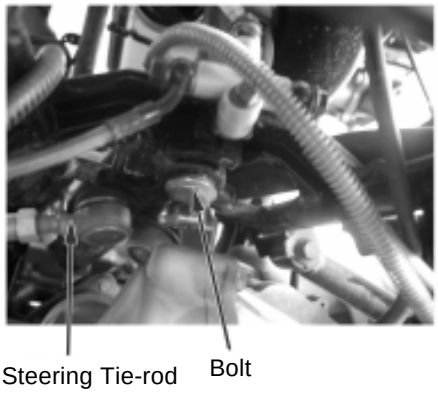


Remove cotter pin.
Remove steering tie-rod installation nut, washer.
Press and separate the steering tie-rod from the steering column.



Remove steering stem installation bolt.

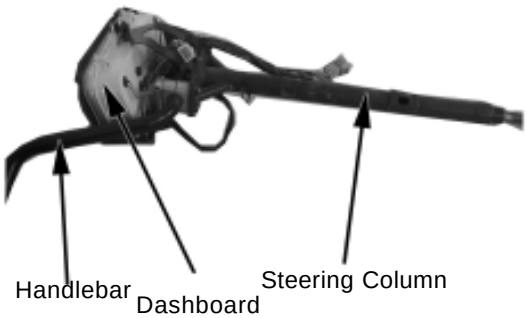
Raise up the steering stem and the handlebar together, then you can remove the steering column.



Installation

For installation,reverse the disassembly procedure.

ATTENTION:Check the agility after finishing the installation.（3-3）
Wires, cables must routes correctly .



Steering Bearing, Oil Seal

Disassembly

Remove front wheel（→8-2）

Remove steering column（→8-18）

Remove front ADWS arm assy（→8-9）

Use special tool separate the steering column and the oil seal from the body.

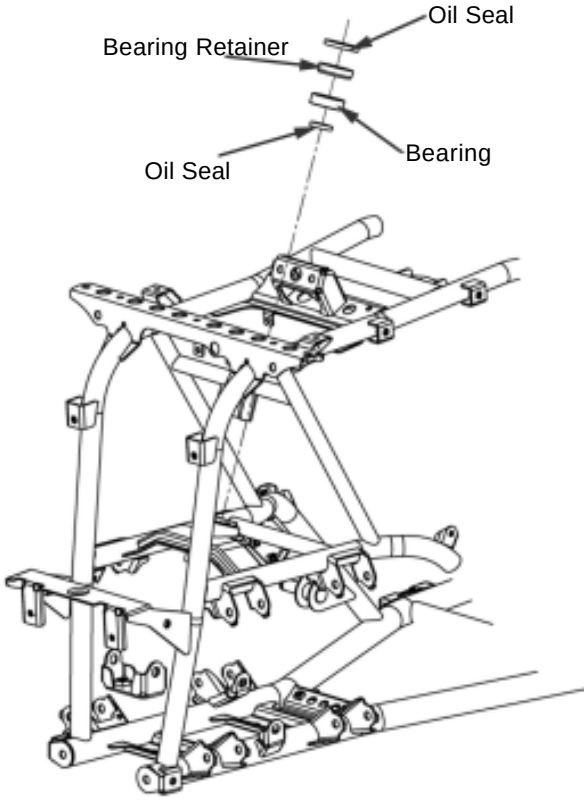
Special tool:

Bearing Remover Component

Rotor Puller

Remover Axle

Remover Heavy Bob



Installation

For installation,reverse the disassembly procedure.

Special tool:

Bearing Race Installation tool A

Assembling Tooling Bar

ATTENTION:Special tool must be used when install the bearing.

ATTENTION:Check the agility after finishing the installation.

Overhaul Information

Operating Notice

Note

- Securely support the vehicle when overhauling the rim and suspension system.
- Use genuine parts of bolts and nuts for rear rim and suspension.
- Do not overexert on the wheels to avoid possible damage to the wheels.
- When removing tires from rim, use special tire lever and rim protector to avoid damage to the rim.

Overhaul Standard

Item			Standard	Limit
Rear Wheel	Rim Vibration	Longitudinal	—	2.0mm
		Horizontal	—	2.0mm
	Tire	Remained Tire Tread	—	3.0mm
		Tire Pressure	30kPa/5Psi	—
Rear Brake	Brake Lever Free Play		10 — 20mm	—

9

Tightening Torque

Rear Wheel Axle Nut: 110–130**Nm**
Rim Mounting Bolt: 50–60**Nm**
Upper Mounting Bolt, Shock Absorber: 40–50**Nm**
Lower Mounting Bolt, Shock Absorber: 40–50**Nm**

Troubleshooting

Rear Wheel Wobbles

- Rim bent
- Faulty Tire
- Tire Pressure Too Low
- Improper Wheel Balance
- Improper Tightening of Wheel Axle Nut
- Loosened Wheel Nut

Rear Shock Absorber is Too Soft

- Weak Spring
- Oil Leakage from Rear Shock Absorber

Rear Shock Absorber is Too Hard

- Bent Rear Shock Absorber
- Tire Pressure is Too High

Poor Brake Efficiency

- Improper Brake Adjustment
- Worn Brake Pad or Brake Disk

Rear Wheel

Removal

Refer to Front Wheel Removal（→8-3）

Inspection

Rim

Damage, bent, serious scrapes:→Replace

Slowly turn the wheel, measure the rim runout with a dial gauge.

Service Limit: Axial:2.0mm
Radial:2.0mm

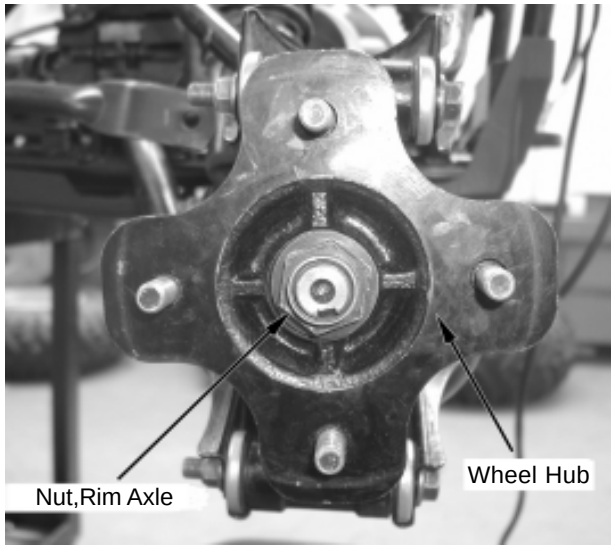
Installation

Refer to Front Wheel Installation（→8-3）

Wheel Hub

Remove:

-Rear Wheel（→9-3）
-Rim Axle Nut
-Wheel Hub



Installation:

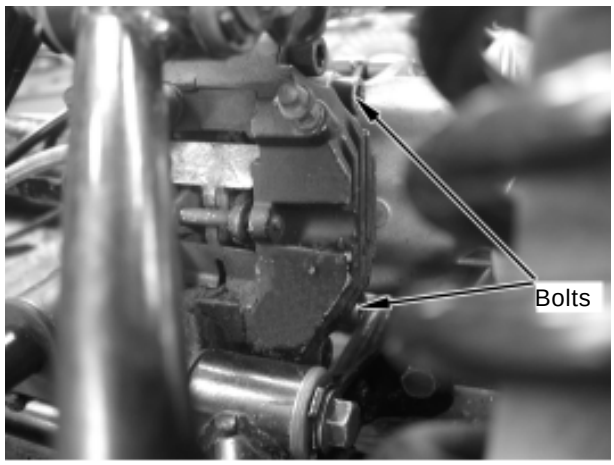
Reverse the removal procedure for installation.
Tightening Torque, Rim Axle Nut:
110-130Nm

Rear Brake

Rear Brake Caliper

Remove:

-Rear Left Wheel（→9-3）.
-2 Bolts from Arm.
-Brake Caliper.

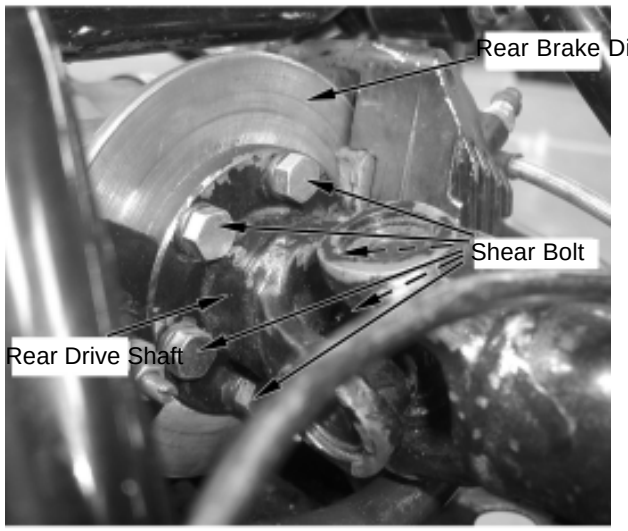


Inspection

Brake Caliper: Cracks, Oil Leakage:→Replace

Installation

Reverse the removal procedure for installation.
Note: Refer to Chapter 1 for brake hose routing.



Rear Brake Disc

Remove:

-Rear Left Wheel（→9-3）
-Rear Drive Shaft
-Rear Brake Caliper（→9-4）
-6 Shear Bolts
-Parking Brake（→9-4）
-Rear Brake Disc（→8-3）

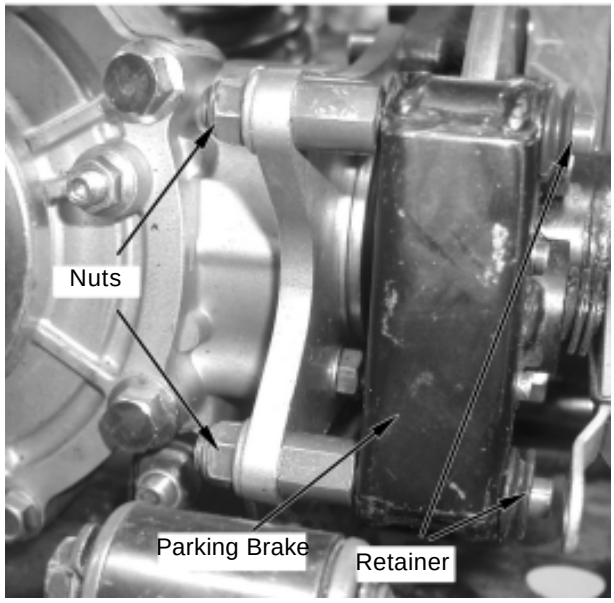
Inspection

Brake Disc: Thickness<6.5mm→Replace

Installation

Reverse the removal procedure for installation.

NOTE: Refer to Chapter 1 for brake hose routing.



Parking Brake

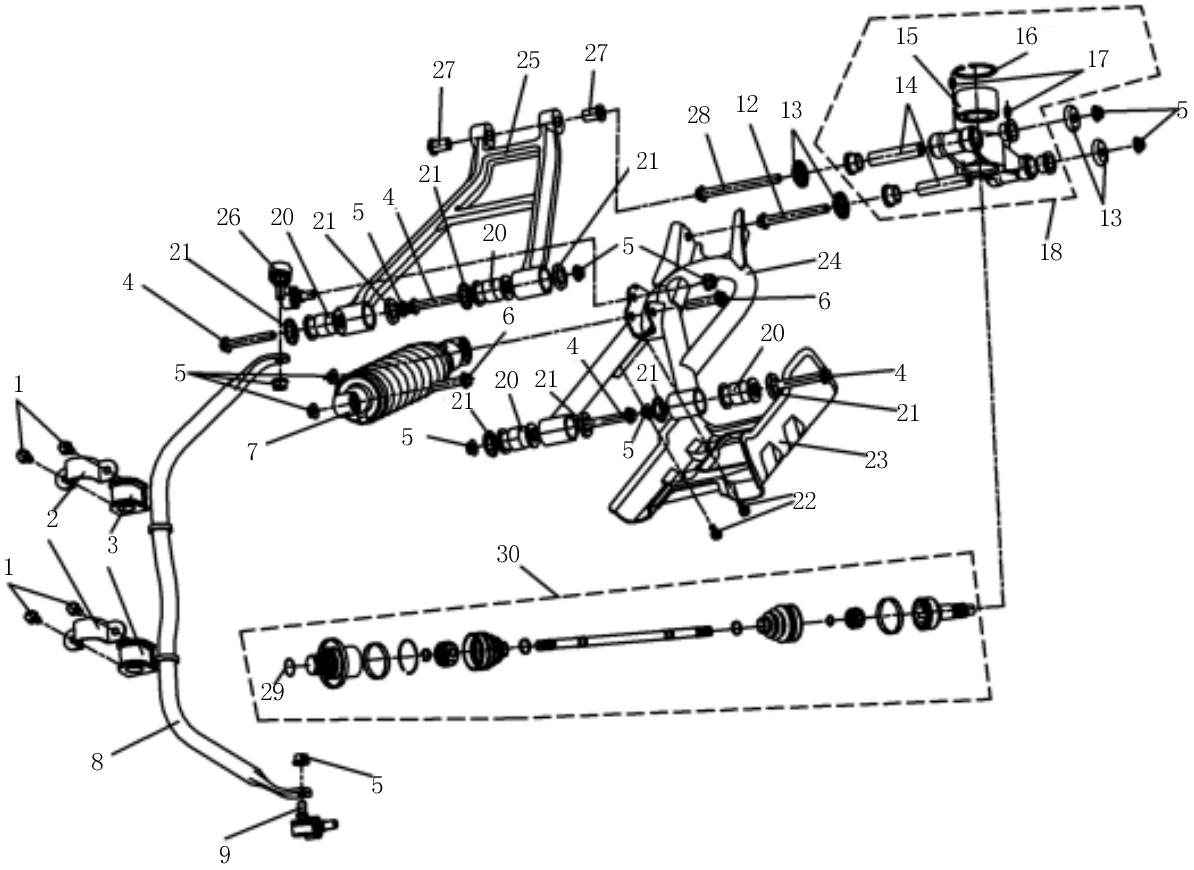
Remove:

-Rear Left Wheel（→9-3）
-Rear Drive Shaft
-Rear Brake Caliper（→8-4）
-6 Shaft Bolts
-Parking Brake

Rear Suspension System

Rear Right Suspension

NOTE:DO NOT remove both left and right suspension at the same time to avoid falling down of the vehicle.



1.BOLT 2.GLAND COVER
3.RUBBER SUPPORT 4. BOLT
5.LOCK NUT 6. BOLT
7.REAR SHOCK ABSORBER
8.STABILIZER BAR
9.BALL PIN,LH 12. BOLT
13.DUST CAP 14.CENTER SPACER
15.BEARING, HUB 16.CIRCLIP
17.OIL CUP
18.HOLDER UNIT, REAR WHEEL SHAFT
20.BUFFERING COLLAR
21.CAP, BUFFERING COLLAR
22.BOLT 23.REAR SUSPENSION PROTECTOR,RH
24.REAR RIGHT ARM (LOWER)
25.REAR RIGHT ARM (UPPER)
26.BALL PIN,RH
27.REAR ROCKER ARM SHAFT SEAT
28.BOLT
29.CONSTANT VELOCITY DRIVE SHAFT,RH, REAR AXLE
30.WIRE CLAMP

Disassembly

Stabilizer Bar

Remove:

Bolt 1,Bolt 8, glander cover 2, Rubber support 3, Bracket(8)and(5), Rubber Support(4)and(9), Nut2(2), Nut10(12),Left Ball Pin 9, Right Ball Pin 26.

Remove: Stabilizer Bar(3)

Installation

Reverse the removal procedure for installation.

Rear Right Absorber

Removal

NOTE:Securely support the vehicle when removing rear left and right absorbers. Suspend wheels from ground.

Maintenance of rear absorbers does not require removal of rear suspension.

Remove the following parts from rear right shock absorber:

-Bolt10(25)

-Nut7(27)

-Bolt7(19)

-Nut8(28)

Remove bolt 6 & scre 6 of the rear right shock absorber from the vehcile body.

Remove rear right shock absorber

Installation

Reverse the removal procedure for installation.

Rear Right Arm

Refer to Front Left Upper Arm in Chapter13 for the removal, inspection and installation of Rear Right Arm.

Rear Left Suspension

Refer to Rear Right Suspension for the removal, inspection and installation of Rear Left Suspension.

Overhaul information

● Standards

Lubricating Priod				
Item	Type	Capacity	Interval	
			Initial	Next
Front Diff	SAE15W/40 SF or SAE80W/90 GL-4	Initial: 0.33L/Replace:0.28L	350km	5000km
Rear Gearcase		Initial: 0.30L/Replace :0.25L		

Tightening Torque Table				
Item	Pcs	Specification	Torque(N.m)	Remark
Front Diff Bolt	6	M8×28	25	
Front Diff Motor Screw	4	M8×20	13	
Pinion Shaft Screw	1	M8×10	13	With loctite
Front Diff nut	1	M14×1.5	62	
Diff. gear bolt	6	M10×1.25×22	45	
Oil bolt,Front Diff	1	M14×1.25 ×12	25	
Drain bolt,Front Diff	1	M10×1.25	25	
Retainer	1	M64×1.5×7	80	
Rear Gearcase Bolt	2	M10×1.25×25	40	
Rear Gearcase Bolt	6	M8×25	25	
Nut,Input Shaft,R/A	1	M12×1.25	70	
Bolt,Input Shaft,R/A	4	M8×30	25	
Retainer, R/A	1	M65×1.5 ×10	70	
Nut	1	M8	16	
Oil Bolt,Rear Gearcase	1	M20×1.5×12	25	
Drain Bolt,Front Diff	1	M14×1.25 ×12	25	

●Inspection & Overhaul

Inspection and overhaul is needed if any of problems below happens to front diff and rear gearcase.

Problem Descriptions	Causes
1. Unstable moving during accelerating, decerating or constant speed. 2. Abnormal sound in front diff or rear gearcase. 3. Engine power tranmission failure to front or rear wheels.	A.Bearing broken. B.Gear clearance over/under size. C.Gear severely worn. D.Gear blocked. E.Drive shaft broken. F.lack of lubricant. G.Foreiggn matter in front or rear gear.

NOTE:A,B,C problems are hard to distinguish. Analysis is needed based on actual break-down catagories.Make sure engine works all right before disassembly of front diff and rear gearcase.

Observation and Judgement

1.Never ignore abnormal sound:

a. Abnormal sounds during accelerating,decelerating have little to do with engine working, but possibly with gears being worn.

b.Constant abnormal sounds during accelerating or decelerating might be caused by incorrect gear lash.

NOTE: Wrong assembly or adjustment of the front diff or rear gearcase will aggravate gear worn and block;

c.Slight sounds will be noticed during low-speed driving, and should not be heard during high-speed driving.This is caused by gear wear.

NOTE: In case of above mentioned itmes, stop the vehicle immediately for inspection until they are solved, or it may cause an accident

2.Check lubrication if it's under normal condition;

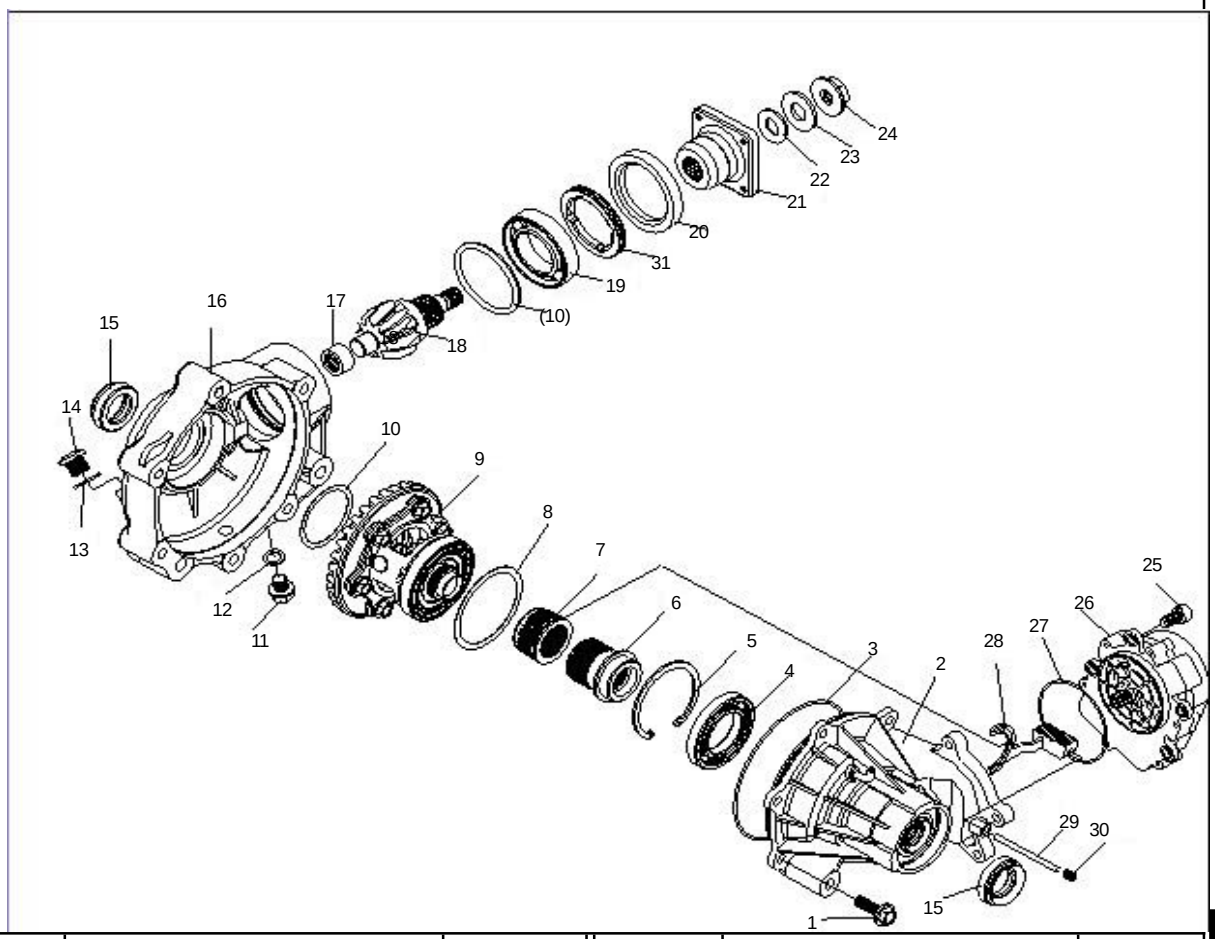
3.Chcek for lubricant leakage;

a.Rear gearcase surface oil leakage;

b.Oil leakage on ground ;

c.Lubricant splash inspection.Check if there is gear case or oil seal leakage. Replace broken parts if necessary.

Front Diff Xploded View



Item	Part Name	Qty	Item	Part Name	Qty
1	Bolt M8×28	6	17	Bearing F1512	1
2	Front Diff	1	18	Drive Pinion Gear	1
3	O-ring 141×2.4	1	19	Bearing 6007	1
4	Bearing 16007	1	20	Oil Seal 48×65×9	1
5	Circlip 62	1	21	Coupler	1
6	Drive Clutch Cover	1	22	O-ring 14×6.8	1
7	Drive Clutch	1	23	Nut Washer	1
8	Adjust Washer φ83×71	1～2	24	Nut M14×1.5	1
9	Differential. Gear assy	1	25	Screw M8×20	4
10	Adjust Washer φ61×48	2～4	26	Gear Motor	1
11	Bolt M10×1.25	1	27	O-ring 81.2×1.9	1
12	Washer 10	1	28	Rack	1
13	Washer 14	1	29	Pinion Shaft	1
14	Bolt M14×1.25	1	30	Screw M8×10	1
15	Oil Seal 24×38×8	2	31	Retainer M64×1.5×7	1
16	Front Diff Cover 1				

Inspection After Front Diff Disassembly

- Check if there is damage or cracks on the front diffrential gear case cover and bearing bore.Replace case cover if necessary;

- Check if front axle bearing clearance is ok,replace bearing if needed.(Using special tools)

- Check if oil seal lips and O-ring are ok. Replace if necessary;

- Check drive pinion gear and differential gear, inspect wear surface. Replace broken or damaged gears.

- Check gear motor working status. Replace if necessary.

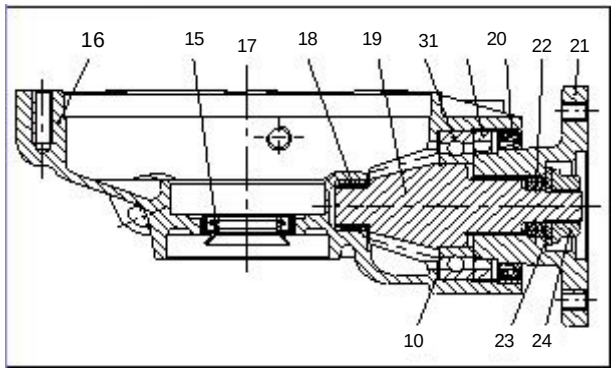
  Gear motor inspection must be carried out with special equipment or tested on the vehicle.

- Check other parts. Replace worn parts .

Front Diff Assembly And Adjustment

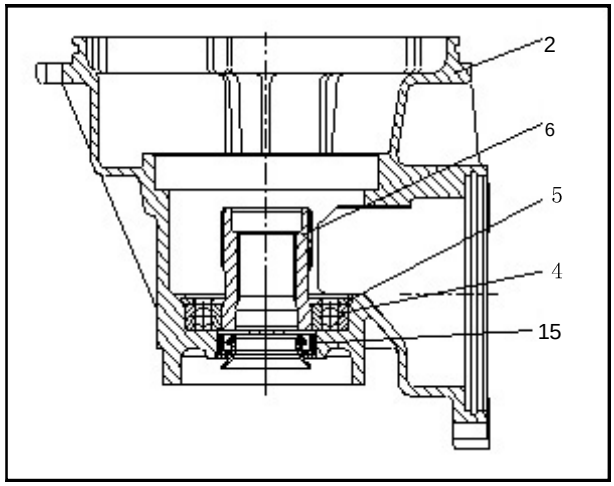
- **Front Diff Case Cover Asselbly**

Item"31 "Tightening torque 80**Nm**
Item "24 "Tightening torque 62**Nm**



NOTE:Use engine oil for oil seal, bearing and drive clutch assembly;"24"Use loctite.

- **Front Diff Case Assembly**



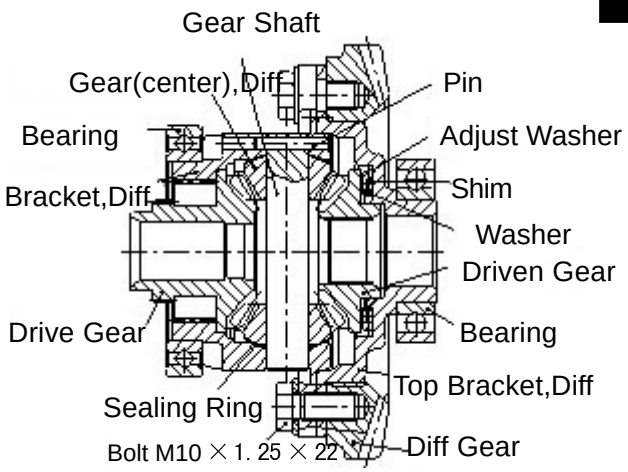
Note: Use engine oil for oil seal or bearing assembly.

- **Differential Gear Assembly**

Bolt M10×1. 25×22 Tightening torque: 45**Nm**

NOTE : Use engine for bearing and differential gear;Use proper washer to make gears mesh correctly.

Washer Thickness	0.1 0.2 0.3 0.4 0.5 1.0



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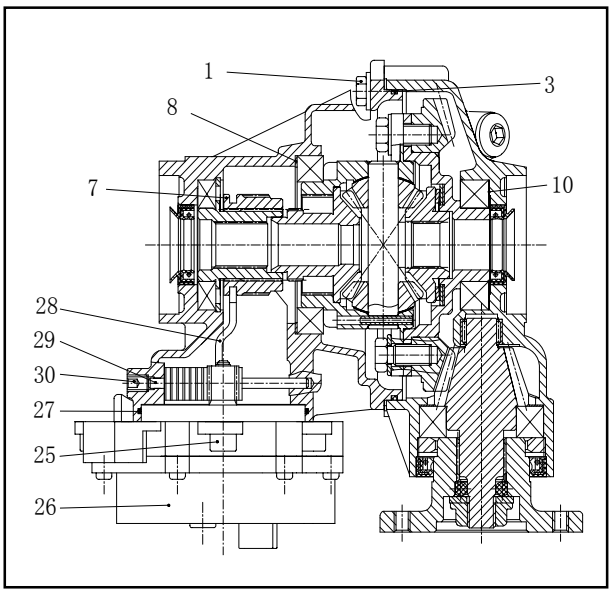
- **Front Diff Assembly And Adjustment**

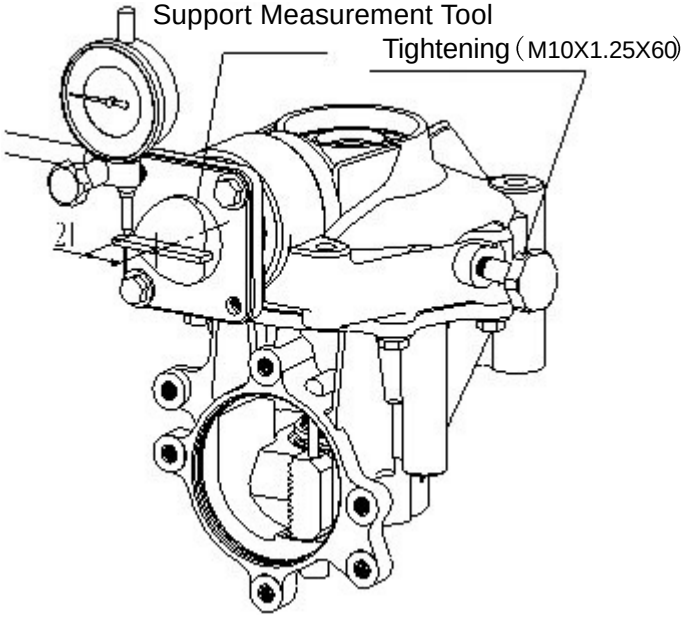
As illustration shows:

Tightening torque	
Item ”1 ”	25**Nm**
Item”25”	13**Nm**
Item ”30 ”	13**Nm**
Bolt	25**Nm**
Bolt	25**Nm**



Use loctite for item”30 ”assembly.

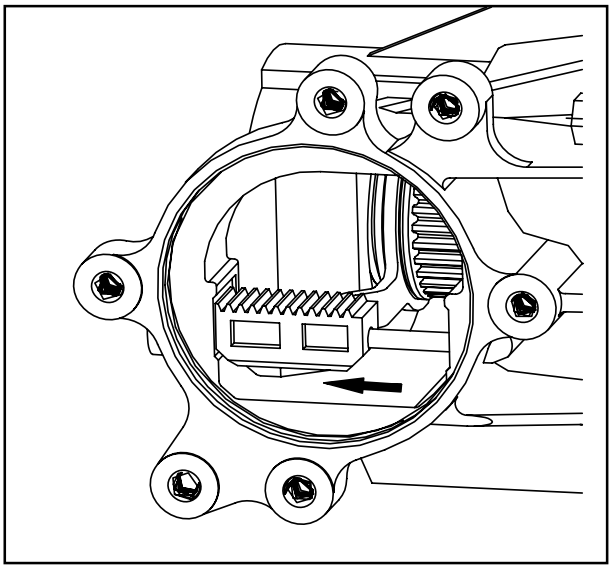
a Use proper washer 8 and 10 thick ness to adjust gear side clearance between drive pinion gear and differential gear



Drive bevel gear clearance measurement; Install support tools,tighening bolts(M10X1.25X60) put up dial indicator, make sure 21 mm is between measuring point and support tools.Turn support tools counter-clock and read the data.

Standard:0.10-0.25

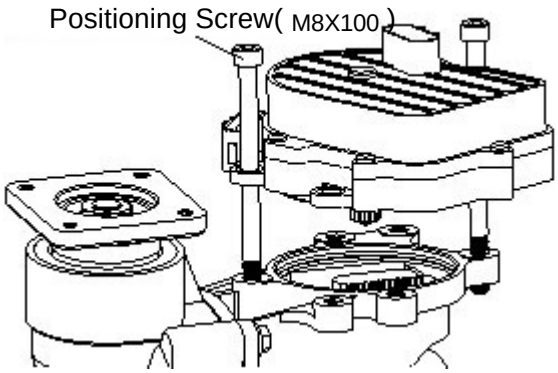
Washer thickness	0.1 0.2 0.3 0.4 0.5 1.0



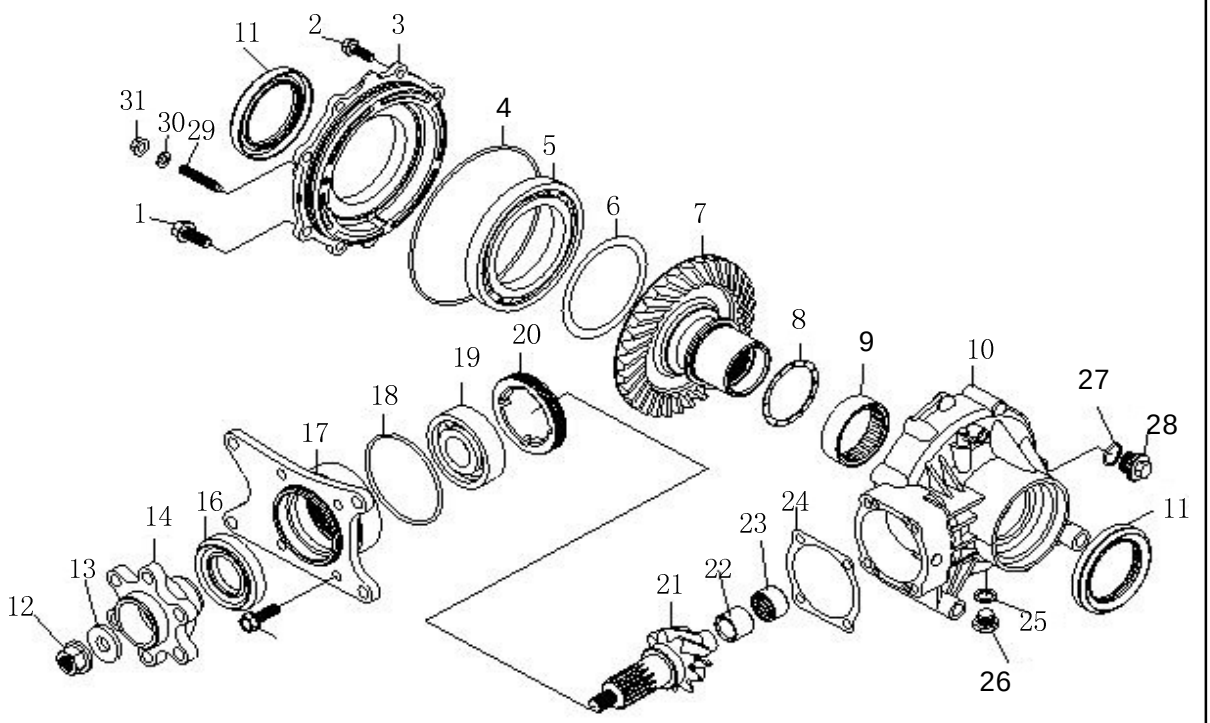
b Shift fork and drive clutch assembly should be in this position when assembly of front axle motor.

c Use special equipment or vehicle control circuit into 2WD position before gear motor assembly

d Make sure b and c is assembled properly and using illustrated positionging screw to assemble gear motor and front axle¡£



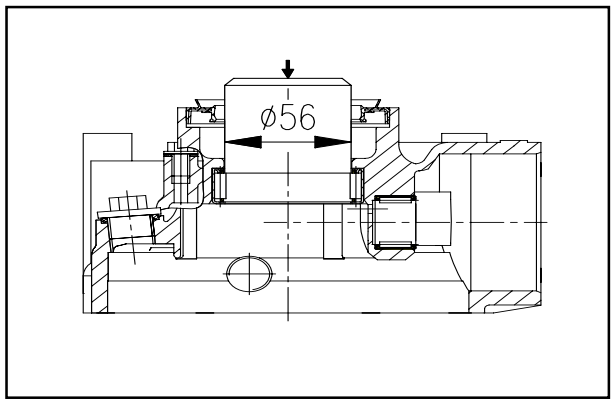
Rear axle exploded view



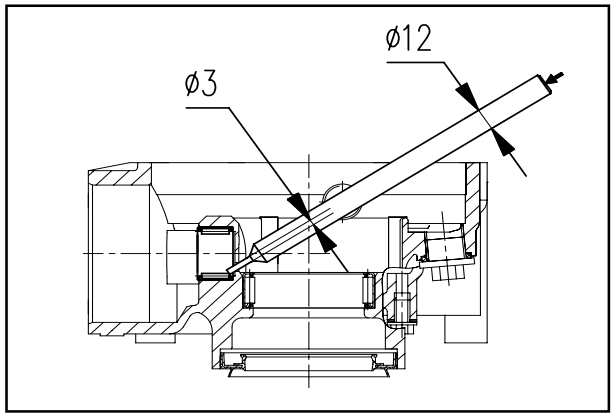
Item	Part Name	Qty	Item	Part Name	Qty
1	Bolt M10 ×1.25 ×25	2	18	O-ring 64.5×3	1
2	Bolt M8 × 25	6	19	Bearing 6305	1
3	Rear Gearcase Bearing Housing	1	20	Bearing Retainer	1
4	O-ring 151 × 3	1	21	Drive Gear, Rear Gearcase	1
5	Bearing 16017/C2	1	22	Bearing Inner Race	1
6	Adjust Washer(2)	1～2	23	Bearing Outer Race	1
7	Driven Gear,Rear Gearcase	1	24	Adjust Gasket	1～3
8	Adjust Washer(1)	1	25	Washer14.5 × 21 × 1.5	1
9	Needle Bearing	1	26	Bolt M14 × 1.25 × 12	1
10	Rear Gearcase	1	27	O-ring 19 × 2.5	1
11	Oil Seal SD4 65×90×9 NS	2	28	Bolt M20 × 1.5 × 12	1
12	Nut M12 × 1.25	1	29	Screw M8 ×45	1
13	Washer 12.5 × 30 × 4	1	30	Washer 8.2 × 15 × 1.5	1
14	Coupler, Rear Gearcase	1	31	Nut M8	1
15	Bolt M8 × 35	4			
16	Oil seal	1			
17	Bevel Gear Bearing Housing	1			

Disassembly Of Bearing

a Disassemble needle bearing as left drawing shown when necessary.



b When replacing needle bearing, rear bearing housing should be heated to 150℃ before removing bearing.

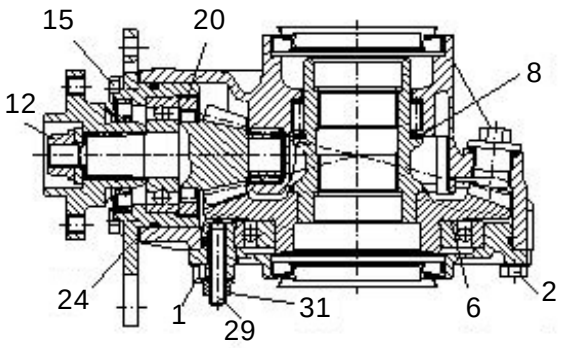


Rear Gearcase Inspection After Disassembly

- Check if there are cracks or damage in rear gearcase, check mounting holes for damage . Replace gear case or right cover if necessary.
- Check all bearings,if rough or damaged,replace as needed.(Special tools are required)
- Check drive bevel gear and ring gear rear axle. Replace if necessary.
- Check oil seal lips, o-ring shape. Replace parts if necessary.
- Check inner and outsider spline. Replace if necessary.
- Check other parts. Replace if necessary.

Rear Gearcase Assembly And Adjustment

- **Illustration**



Tightening Torque	
Item ”1”	40**Nm**
Item ”2”	25**Nm**
Item”12”	70**Nm**
Item”15”	25**Nm**
Item”20”	70**Nm**
Item”31”	16**Nm**
Bolt	25**Nm**
Bolt	25**Nm**

Use loctite for Item”29”assembly

- Assembly and clearance adjustment of drive gear of rear axle

a By choosing “24”washer to adjust clearance.

b By choosing “6” washer to adjust clearance.

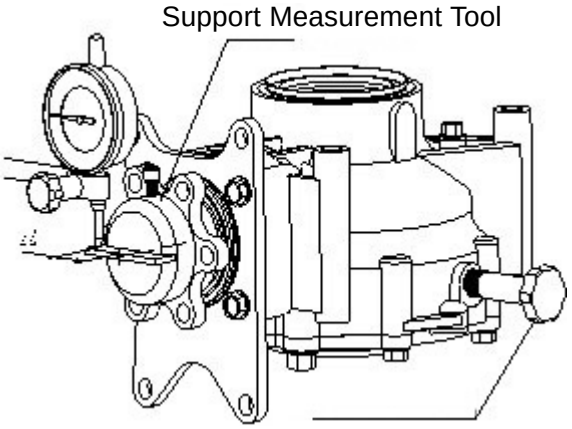
c By coating color to check contact surface if it’s ok for mating.

d Inspect installing clearance by checking bevel gear clearance;By using assistant measurement tool to check its clearance.

Standard:0.1-0.2

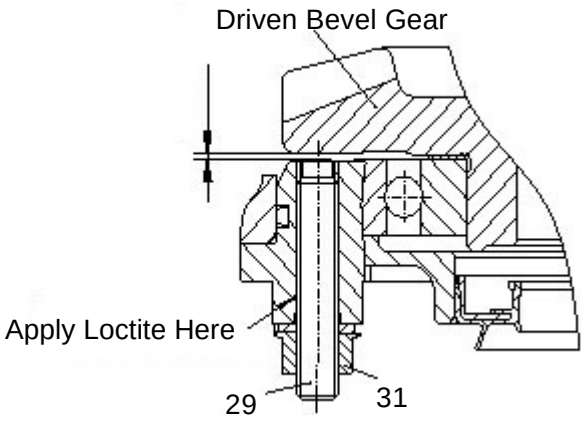
e Keep installing point bearing clearance 0. 1-0.2 by choosing ”8’ washer.

Washer “6”	Thickness: 0.2 0.3 0.4
Washer “8”	Thickness 1.0 1.2 1.4 1.6 1.8
Wahser ”24”	Thickness 0.4 0.5 0.6



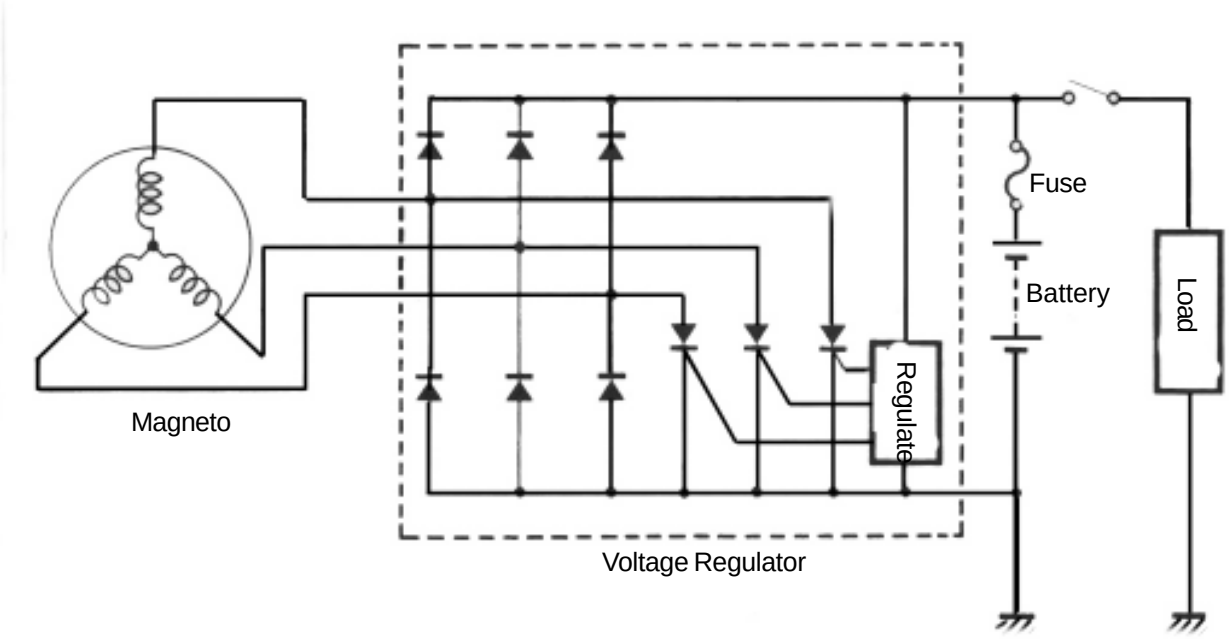
Tightening(M14 × 1.25 × 60)

f Adjust item 29 as illustrated, and make sure its end and back clearance of drive gear is 0.3-0.6. Tighten item 31.



△ CHARGING SYSTEM

CHARGING CIRCUIT DIAGRAM

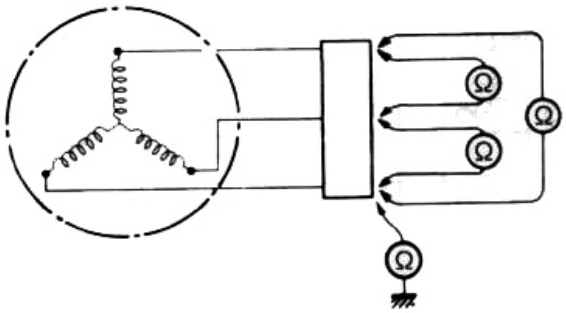


MAGNETO COIL RESISTANCE

● MEASURE TRIPHASE MAGNETOR STATOR COIL RESISTANCE

● IF THE RESISTANCE VALUE OUT OF PRE-SCRIBED VALUE, REPLACE THE STATOR COIL.

● INSPECT IF THE STATOR COIL AND STATOR CORE INSULATION.



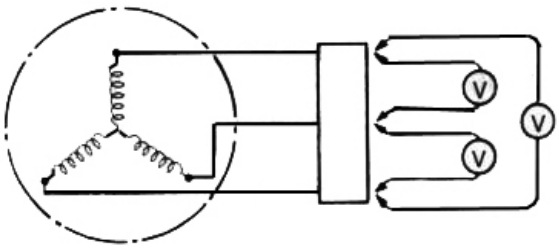
TURN **MULTIMETER** TO 1X10 Ω

MAGNETO COIL RESISTANCE: 0.5-1.5 Ω
(**YEL LOW-YELLOW**)
INSULATING RESISTANCE: ∞ Ω
(**YELLOWGROUND**)

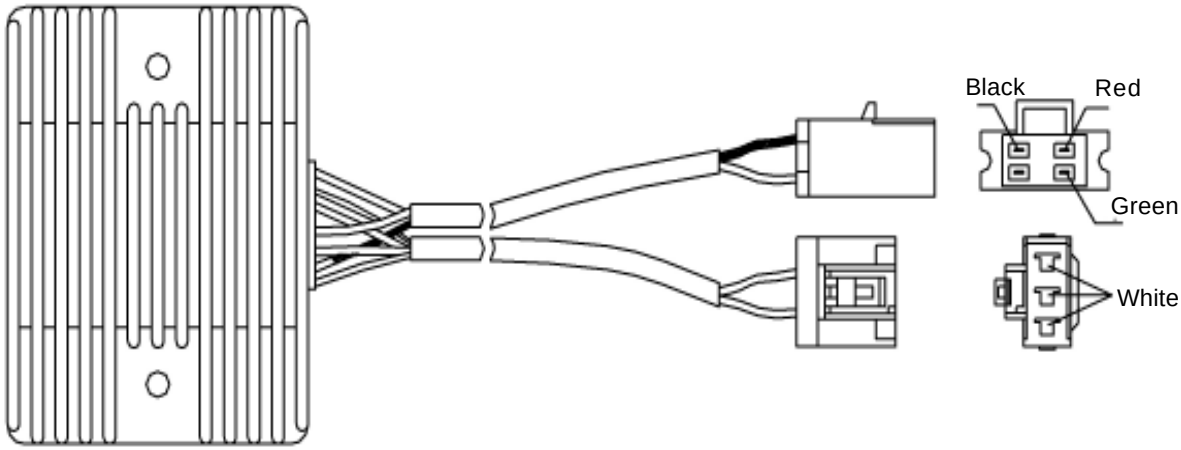
MAGNETOR NON-LOADED PER FORMANCE

● START THE ENGINE LET IT GOES TO 5000Rpm USE MULTIMETER MEASURE MAGNETO STATOR COIL THREE OUTPUT LINE VOLTAGE.

● IT THE RESULT VALUE BELLOW THE SETTING VALUE, CHANGE A NEW MAGNETO.



ADJUST MULTIMETER TO ALTERNATING VOLT AGE GRADE
MAGNETOR NON-LOADED STATE COIL VOLT AGE VALUE:
5000Rpm > 200V(ALTERNATING CURRENT)



- USE MULTIMETER MEASURE THE RESISTANCE BE TWEEN THE TERMINALS,AS BELOW FORM SHOWS, IF THERE IS ONE DATA OUT OF THE SETTING VALUE, REPLACE WITH A NEW ONE.

  ADJUST MULTIMETER TO DIODE

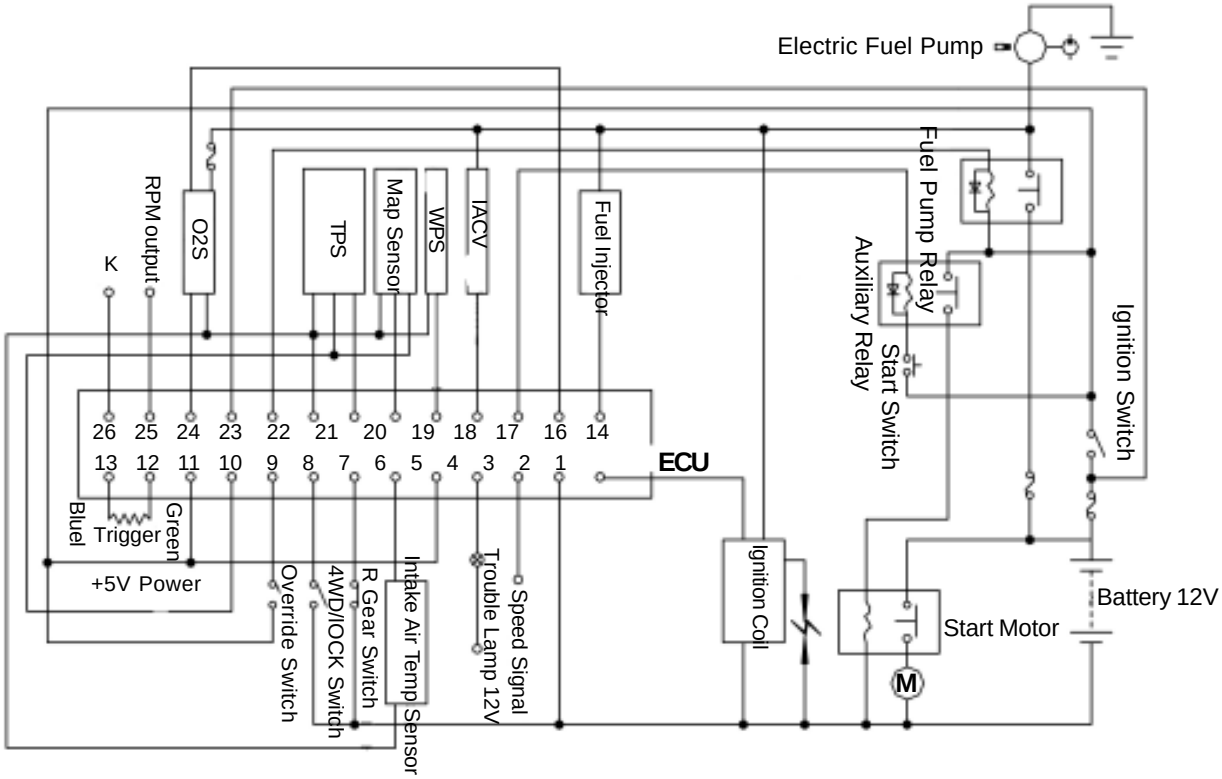
- AFTER ENGINE RUNNING, BATTERY FULL POWER, IF VOLTAGE BETWEEN RED LINE, GREEN LINE EX CEED 15V OR UNDER 12V,REPLACE WITH A NEW ONE.

ATTENTION:
WHEN MULTIMETER PROBE UNCONNECTED,IF THE MULTIMETER SHOWS BELLOW 1.4V, THEN REPLACE IT'S BATTERY.

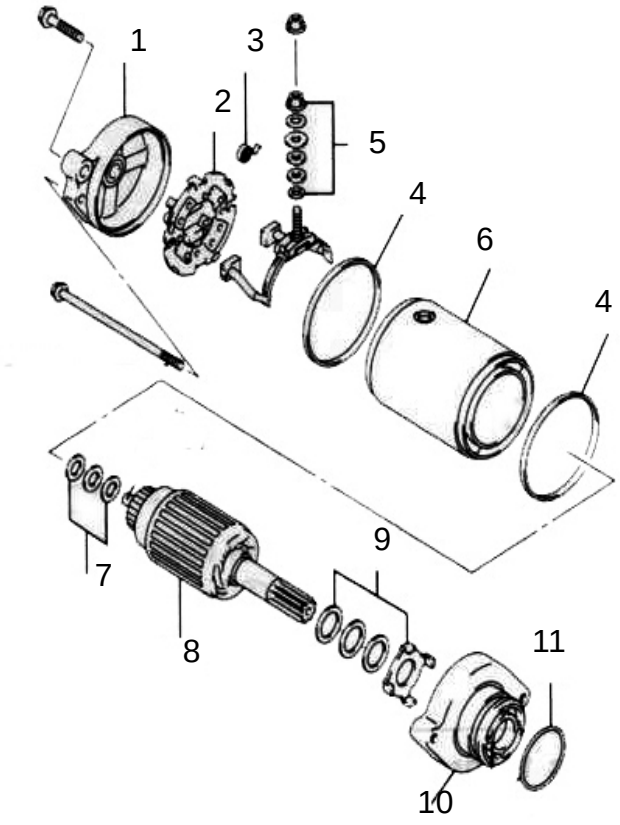
		Red ⊕					
		Yellow	Yellow	Yellow	Green	Red	Black
Black ⊖	Yellow		∞	∞	400-500	∞	∞
	Yellow	∞		∞	400-500	∞	∞
	Yellow	∞	∞		400-500	∞	∞
	Green	∞	∞	∞		∞	∞
	Red	400-500	400-500	400-500	750-800		∞
	Black	∞	∞	∞	∞	∞	

△ STARTING SYSTEM

TRIGGER CIRCUIT DIAGRAM



STARTING MOTOR



1.End Cover
2.Brush Holder
3.Brush Spring
4.O-ring
5.Brush Terminal
6.Starting Motor Cylinder
7.Washer
8.Armature
9.Washer
10.Inner Cover
11.O-ring

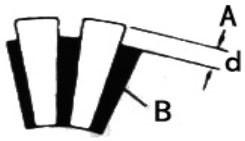
ELECTRIC BRUSH

- CHECK IF THE ELECTRIC BRUSH PERMANENT SEAT ABNORMAL,CRACK,UNSMOOTH
- IF THERE IS ANY BROKEN, CHANGE THE WHOLE ELECTRIC BRUSH ASSEMBLY

COMMUTATOR

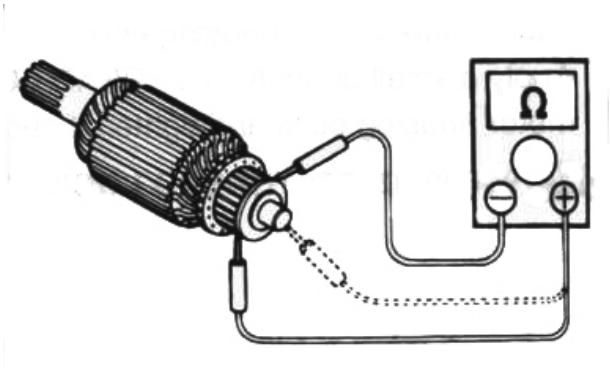
- CHECK IF THE COMMUTATOR CHANGE COLOR, ABNORMAL DAMAGE OR OVER WEAR.
- IF THERE IS WEAR OR DISCOLORATION , RE PLACE WITH A NEW AMATURE.
- IF THE COMMUTATOR SURFACE DISCOLOURATION, POLISH WITH SEND PAPER AND WIPE UP WITH DRY CLOTH.
- IF OVER WEAR, CUT PART OF B INSULATOR WITH BLADE,KAME THE DISTANCE BETWEEN A AND B TO d.

d ⩾ 1.5mm



ARMATURE COIL

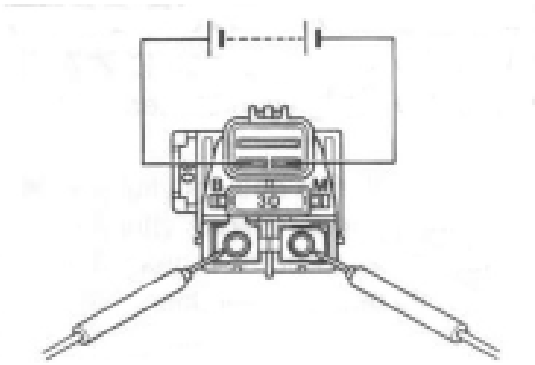
USE MULTIMETER CHECKING IF IT IS INTERCOMMUNICATION BETWEEN THE TERMINALS, BETWEEN TERMINALS AND ARMATURES .IF THEY NOT COMMUNICATION, REPLACE WITH A NEW ARMATURE.



OIL SEAL

CHECKING IF OIL SEAL LIP DESTROY OR OIL LEAK. IF THERE IS ANY DESTROY OR LEAKAGE, REPLACE WITH A NEW STARTING DYNAMO.

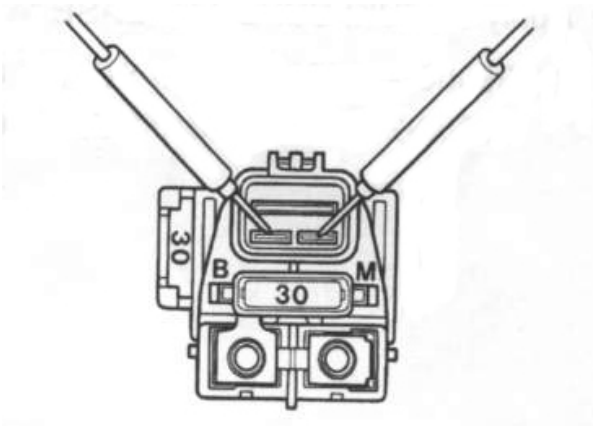
INITIATING RELAY



- PUT 12V TO THE SMALL TERMINALS;THERE IS CONTINUITY BETWEEN THE LARGE TERMINALS.
- IF THE START RELAY CONTACTS,SHOULD MAKE A CLICKING SOUND.
- WHEN POWER IS TAKEN AWAY FROM THE SMALL TERMINALS,THERE SHOULD BE NO CONTINUITY BETWEEN LARGE TERMINALS.
- IF BOTH ABOVE TWO ITEMS ARE OK,IT INDICATES THE RELAY IS OKAY.
  ADJUST MULTIMETER TO DIODE GRADE.

WARNING:

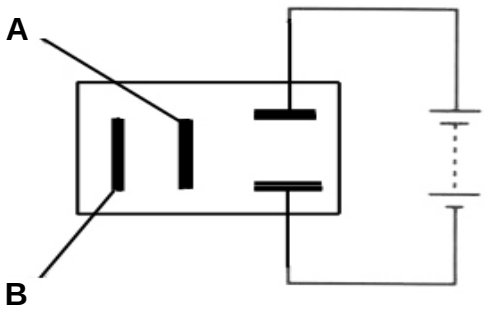
RELAY VOLTAGE LOADED CANNOT EXCEED 2MINS, OR ELSE,IT WILL CAUSE THE RELAY OVERHEAT AND BURN THE RELAY COIL.



- USE MULTIMETER MEASURING STARTING RELAY COIL RESISTANCE,IF THE VALUE OUT OF THE SETTING RANGE, REPLACE WITH A NEW ONE.
- ADJUST **MULTIMETER** TO 1X10 Ω

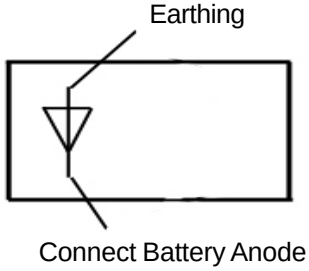
START AUXILIARY RELAY COIL RESISTANCE:
3-5 Ω

START AUXILIARY RELAY,FULE PUMP RELAY



- APPLY 12VOLTS TO THE TWO TERMINALS.USE MULTIMETER MEASURE IF CONTACTS A,B IS MEET. ADJUST MULTIMETER TO DIODE GRADE.
- IF THE STARTING RELAY CLICKS .
- WHEN NON-LOADED 12V VOLTAGE,THE TWO CONTACTS UNCONNECTED.
- EITHER OF THE ABOVE TWO ITEMS IS SHOWS THE RELAY IS FINE.
- ADJUST MULTIMETER TO **1X100** Ω , MEASURING THE COIL RESISTANCE

AUXILIARY RELAY COIL RESISTANCE:90-100 Ω



ATTENTION:
AT THE BACK OF AUXILIARY RELAY,PARALLEL TO THE DIODE DIRECTION, IT IS THE RELAY COIL'S ANODE.

STARTING ENGINE NOTICE

- JOINT LINES ACCORDING TO TRIGGER CIRCUIT.
- BEFORE STARTING, CHECK IF ALL THE PARTS ARE CORRECT JOINTED.ELECTRICITY SPRAYING JOINT SEE BELOW:
- CHECK IF GAS CIRCUIT NORMAL.
- CHECK IF OIL CHANNEL AT FAULT.
  IF BLOCKED,CLEAR BLOCKED PART, SECURE FUEL CHANNEL SMOOTH.
  IF LEAKAGE,RELINK LEAK SECTION, SECURE THE FUEL CHANNEL NO LEAKAGE.

Fuel Pressure Gauge

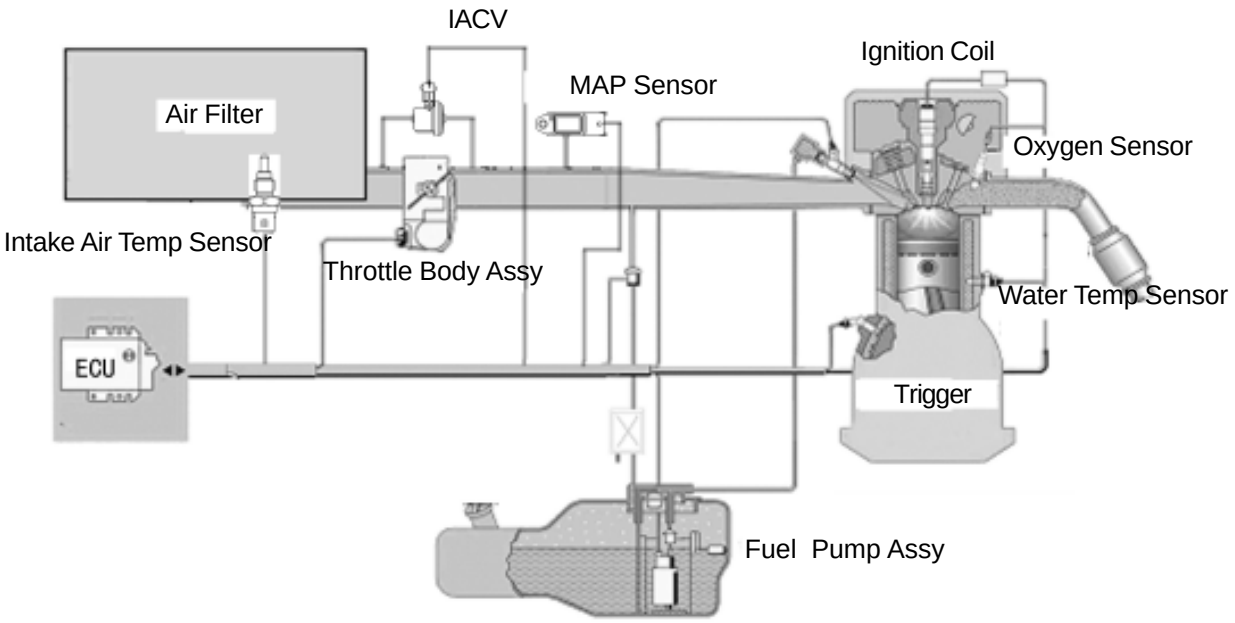
- USE FUEL PRESSURE GAUGE TO MEASURE FUEL PRESSURE.

FULE PUMP OUTPUT PORT PRESSURE:0.3±0.01Bar.

- CHANGE ENGINE SHIFT HAND LEVER TO NEUTRAL.
- USE DIAGNOSTIC EQUIPMENT CHECK IF AT FAULT, IF YES, CLEARING OF FAULT ACCORDING TO DIAGNOSTIC TROUBLE CODE.
- CLOSE THROTTLE,TURN OFF THE IGNITION SWITCH,PRESS START SWITCH 3-5 SECONDS:
- START THE ENGINE, WARM UP TO IDLE SPEED STABLE,EXAMINE IDLING SPEED:

IDLING SPEED:1400±100rpm.

△ELECTRONIC FUEL INJECTION SYSTEM



ENGINE ELECTRONIC FUEL INJECTION SYSTEM INCLUDING THREE PARTS:

(1)SENSOR:

TRANSFORM THE ENGINE NON-ELECTRICITY PHYSICAL QUANTITY TO ELECTRICITY QUANTITY, AND PROVIDE ALL THE INFORMATIONS TO THE ELECTRONIC CONTROL UNIT.IT IS THE ELECTRONIC CONTROL'S SPY. INCLUDING THE FOLLOWING SENSORS:

- **INLET PRESSURE SENSOR** (LOADING INFORMATION).
- INLET **AIR TEMPERATURE SENSOR** (AIR DENSITY INFORMATION).
- THROTTLE **POSITION SENSOR** (LOADING INFORMATION¡¢LOADING RANGE INFORMATION, CCELERATION AND DECELERATION INFORMATION).
- TRIGGER (BENT AXLE PHASE POSITION INFORMATION).
- **WATER TEMPERATURE SENSOR** (ENGINE TEMPERATURE INFORMATION).
- ODOMETER **SENSOR** (OUTPUT SHAFT SPEED INFORMATION).
- GEAR SENSOR（GEAR INFORMATION) **(INCLUDING GEAR SENSOR AND REVERSE GEAR SENSOR)**
- OXYGEN SENSOR(EXCESS AIR COEFFICIENT ABOVE 1 OR LOWER THAN 1）
- FOUR **WHEEL DEAD LOCK** (4WD DEAD LOCK INFORMATION).
- **ASSISTOR SWITCH** (RELIEF SPEED LIMIT INFORMATION).

(2)ECU:

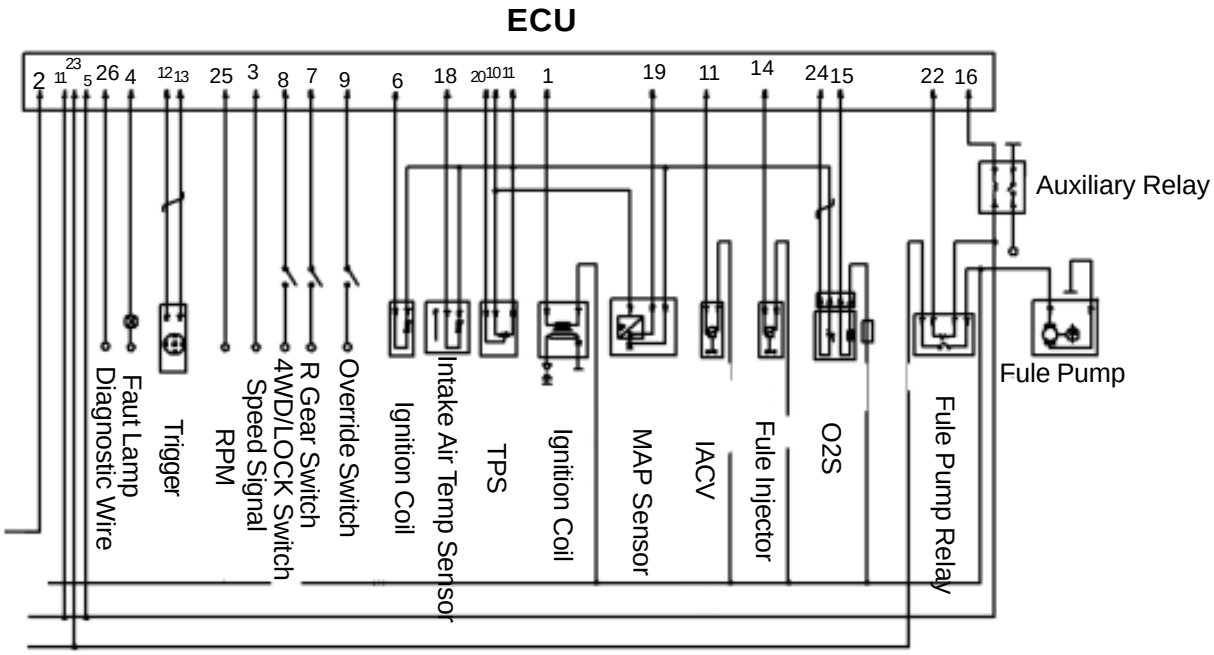
ELECTRONIC CONTROL UNIT, IT IS THE BRAIN OF THE ENGINE MANAGEMENT SYSTEM.IT ANALYZE AND PROCESS KINDS OF INFORMATIONS PROVIDE BY THE SENSORS, REACH A CONCLUSION, AND THEN TRANSMIT THE CONCLUTION TO THE ACTUATOR, SO AS TO ENSURE THE ENGINE OPERATION UNDER OPTIMAL STATE.

(3) **ACTUATOR:**

EXECUTE THE ECU INSTRUCTION. THE ACTUATOR IS THE HAND OF ECU, THE MAIN ACTUATORS ARE.

- FUEL PUMP ASSY(SUPPLY HIGH PRESSURE FUEL).
- FUEL INJECTOR(INJECTQUOTAL FUEL,MAKE FUEL SPRAY EXCELLENT).
- IGNITION COIL(PROVIDE HIGH PRESSURE IGNITION ENERGY TO SPARK PLUG).
- IDLE SPEED CONTROL VALVE(PROVIDE IDLE SPEED AIR INPUT).

ELECTRONIC FUEL INJECTION SYSTEM DIAGRAM



ELECTRONIC FUEL INJECTION SYSTEM MAINTENANCE NOTICE

- USE QUALITY COMPONENTS FOR SERVICE, OR ELSE IT CANNOT GUARANTEE THE ELECTRONIC FUEL INJECTION NORMAL OPERATION.
- IN THE COURSE OF MAINTENANCE, NEVER TRY TO BREAK DOWN THE ELECTRONIC PARTS.
- IN THE COURSE OF MAINTENANCE, THE ELECTRONIC COMPONENTS MUST BE HANDLED CAREFULLY.
- WHEN CUT DOWN OR CONNECT UP PLUG CONNECTOR, YOU MUST TURN OFF THE IGNITION SWITCH, OR ELSE THE ELECTRONIC FUEL INJECTION COMPONENTS WILL BE DAMAGED.
- WHEN TAKE DOWN THE ELECTRIC FUEL PUMP, DONOT ENERGIZE THE FUEL PUMP, IT CAN GENERATE SPARK AND CAUSE FIRE.
- FUEL PUMP NOT PERMITTED DO OPERATION TEST UNDER DRY STATE OR IN WATER.OR ELSE WILL SHORTEN IT'S LIFE. BESIDES,THE OIL FUEL PUMP TWO EXTREMES CANNOT REVERSE CONNECTION.
- ELECTRONIC FUEL INJECTION SYSTEM FUEL SUPPLY PRESSURE IS HIGH(AROUND 300kPa),THE FUEL PIPE ALL APPLY HIGH PRESSURE RESISTANCE PIPE,SO DO NOT DISMANTLE THE PIPE WHEN THE FUEL SYSTEM NEEDED TO BE REPAIRED,YOU HAVE TO DO FUEL PIPE PRESSURE RELIEF BEFORE DISMANTLE THE OIL PIPE.PRESSURE RELIEF METHOD IS AS FOLLOWING:

  REMOVE FUEL PUMP RELAY,STARTING THE ENGINE AND LET IT IDLE , UNTILL THE ENGINE DIES ITSELF.

FUEL PIPE'S DISMANTLE AND FUEL FILTER¡¯S REPLACEMENT SHOULD BE CARRY ON BY PROFESSIONAL PERSON IN WELL-VENTILATED PLACE.

- WHEN INSPECTING THE IGNITION SYSTEM,ONLY IF NECESSARY,DO SPARK TEST,AND SHOULD BE AS FAST AS POSSIBLE, DONOT OPEN AIR SAMPER WHEN TESTING, OR ELSE PLENTY OF UNBURNED FUEL WILL ENTER THE VENT-PIPE AND DAMAGE THE TRIPLET CATALYST.
- IDLE SPEED REGULATION COMPLETELY CARRY OUT BY ELECTRONIC FUEL INJECTION SYSTEM,THROTTLE VALVE GUN LIMIT SCREW ALREADY SETTED WHEN IT LEAVE THE FACTORY,IT INITIAL POSITION CANNOT BE CHANGED EASILY.
- WHEN INSTALLING THE BATTERY, THE POSITIVE AND THE GROUND CANNOT BE INSTALLED WRONG. THIS SYSTEM APPLYS NEGATIVE GROUND.
- WHEN ENGINE RUNNING,DON'T UNHOOK THE BATTERY CABLE.
- BEFORE CARRY OUT ELECTRONIC WELDING ON THE VEHICLE,YOU ARE REQUIRED TO UNHOOK THE BATTERY POSITIVE TERMINAL, NEGTIVE TERMINAL AND ECU.
- DONOT USE METHOD IMPALE LEAD CUTICULAR TO TEST COMPONENTS'S INPUT AND OUTPUT ELECTRICAL SIGNAL.
- SET UP ENVIRONMENTAL PROTECTION CONSCIOUSNESS. TREATING THE WASTE AFTER MAINTENANCE.

SERVICE TOOLS

TOOL NAME:DIAGNOSTIC EQUIPMENT

FUNCTION:
READ CLEAR ELECTRONIC FUEL INJECTION SYSTEM TROUBLE CODE,OBSERVE DATA STREAM, COMPONENETS MOTION TESTS.

TOOL NAME:DIGITAL MULTIMETER

FUNCTION:
INSPECT ELECTRONIC FUEL INJECTION SYSTEM VOLTAGE,CURRENT, RESISTANCE ETC.

TOOL NAME:VACUUM METER

FUNCTION:
INSPECT INLET PIPE PRESSURE STATE.

TOOL NAME:ELECTRONIC IGNITION TIMING

FUNCTION:
INSPECT ENGINE ELECTRONIC SPARK TIMING.

TOOL NAME:CYLINDER PRESSURE GAUGE

FUNCTION:
CHECK CYLINDER COMPRESSION.

TOOL NAME:FUEL PRESSURE GAUGE

FUNCTION:
INSPECT FUEL SYSTEM PRESSURE STATE,JUDGE THE FUEL SYSTEM FUEL PUMP AND FUEL PRESSURE REGULATING VALVE WORK STATE.

ELECTRONIC FUEL INJECTION PARTS STRUCTURE AND FUNCTION

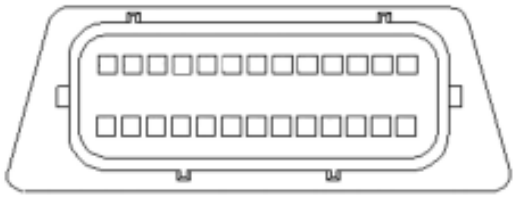
(1)ECU:

ECU,IT IS THE BRAIN OF THE ENTIRE ELECTRONIC FUEL INJECTION SYSTEM. IT ANALYZE AND PROCESS THE INFORMATIONS PROVIDED BY THE SENSOR, REACH A CONCLUSION, THEN TRANSMIT THE CONCLUSION TO THE ACTUATOR AS INSTRUCTION,SO AS TO MAKE THE ENGINE OPERATION IN OPTIMAL STATE.

ECU

ECU EACH STITCH FUNCTION:

1.IGNITION COIL CONTROL SIGNAL
2.GROUND
3.VEHICLE SPEED SIGNAL
4.TROUBLE LAMP
5.IGNITION SWITCH POWER+
6.INTAKE AIR TEMPERATURE SENSOR SIGNAL
7.REVERSE GEAR
8.4WD DEAD LOCK SWITCH SIGNAL
9.ASSISTOR SWITCH SIGNAL
10.+5VPOWER OUTPUT
11.IGNITION SWITCH POWER+
12.TRIGGER SIGNALA
13.TRIGGER SIGNALB
14.OIL ATOMIZER
15.OXYGEN SENSOR HEATING
16.SUPPLEMENTARY RELAY
17.IDLE SPEED CONTROL VALVE(CARBON TANK CONTROL VALVE)
18.WATER TEMPERATURE SENSOR SIGNAL
19.INLET PRESSURE SENSOR SIGNAL
20.AIR DAMPER POSITION SENSOR SIGNAL
21.SENSOR
22.OIL PUMP
23.BATTERY POWER+
24.OXYGEN SENSOR
25.ENGINE SPEED OUTPUT



ECU Connector

LIMIT DATA:

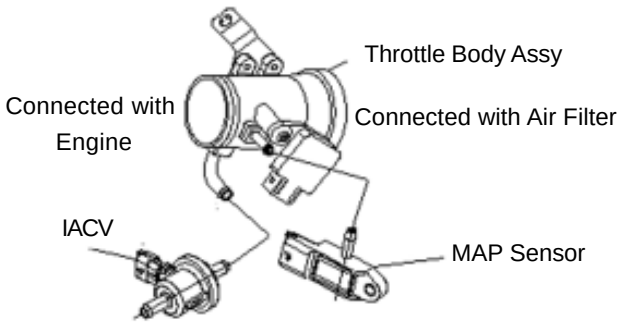
Quantity		Value			Unit
		MIN	Typical	MAX	
Battery Voltage	Nornmal Operation	9.0	14.0 ± 1	16.0	V
	Limited Function	6.0-9.0		16.0-18.0	V
Withstanded Overvoltage and Time	26.0V	Limited Function Such As Diagnosis		5.0	Min
Working Temp		-40		+70	℃
Storage Temp		-40		+90	℃

● **DISALLOW TO ADD LOAD ON CRUST OR COVER BOARD.**

●**HANDLED CAREFULLY AND AVOID TO DROP ON THE FLOOR.**

(2)THROTTLE VALVE ASSY:

JOIN THE AIR CLEANER AND ENGINE,CONTROL THROTTLE VALVE OFF AND ON ANGLE THROUGH THROTTLE CABLE. AIR DAMPER POSITION SNESOR TRANSMIT ANGLE SIGNAL TO ECU.

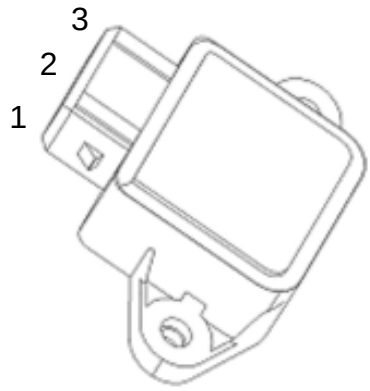


EACH PIN FUNTION:

1.CONNECT 5V POWER

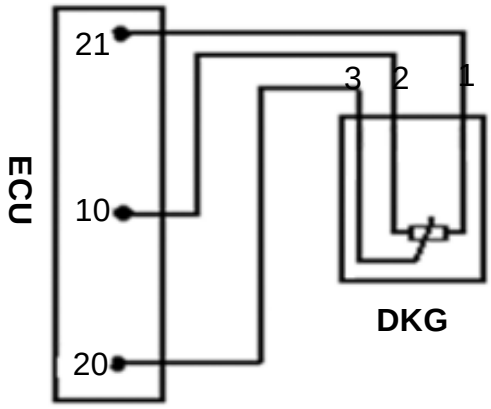
2.GROUNDING

3.OUTPUT VOLTAGE SIGNAL



TPS

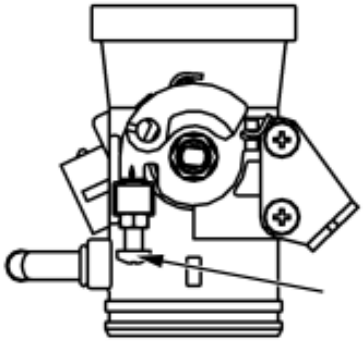
THE RIGHT DRAWING IS THE WIRING DIAGRAM WITH ECU



TPS Wiring Diagram

IDLE SPEED LIMIT SCREW NOT ALLOWED TO BE ADJUSTMENT.

- ENGINE IDLE SPEED COMPLETELY DEPEND UPON ELECTRONIC SPRAYING SYSTEM ADJUSTMENT. DO NOT ADJUST THE IDLE SPEED SCREW.



Idle Speed Ajuster

(3)MAP Sensor:

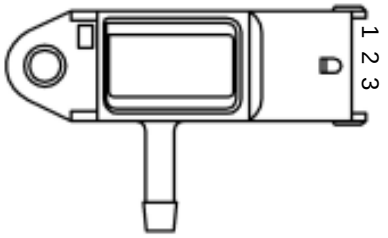
MONITOR AIR PRESSURE IN MANIFOLD,PROVIDE ENGINE LOAD INFORMATION TO ECU.

EACH STITCH FUNCTION:

1.CONNECT 5V POWER

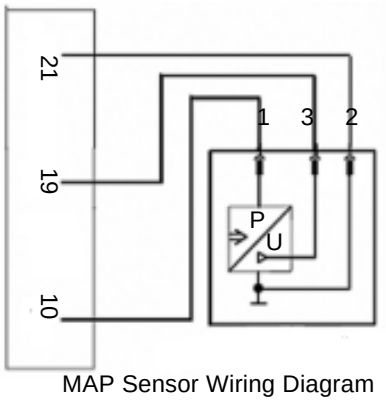
2.GROUNDING

3.OUTPUT VOLTAGE SIGNAL



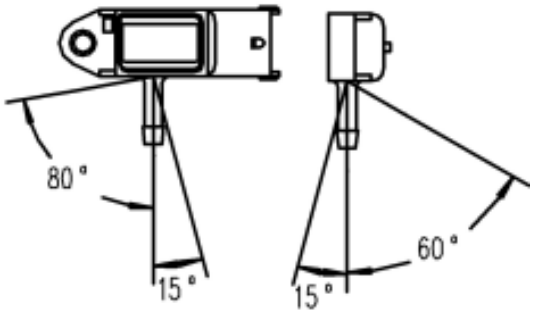
MAP Sensor

THE RIGHT DRAWING IS THE CONNECTION DRAWING FOR SENSOR&ECU.



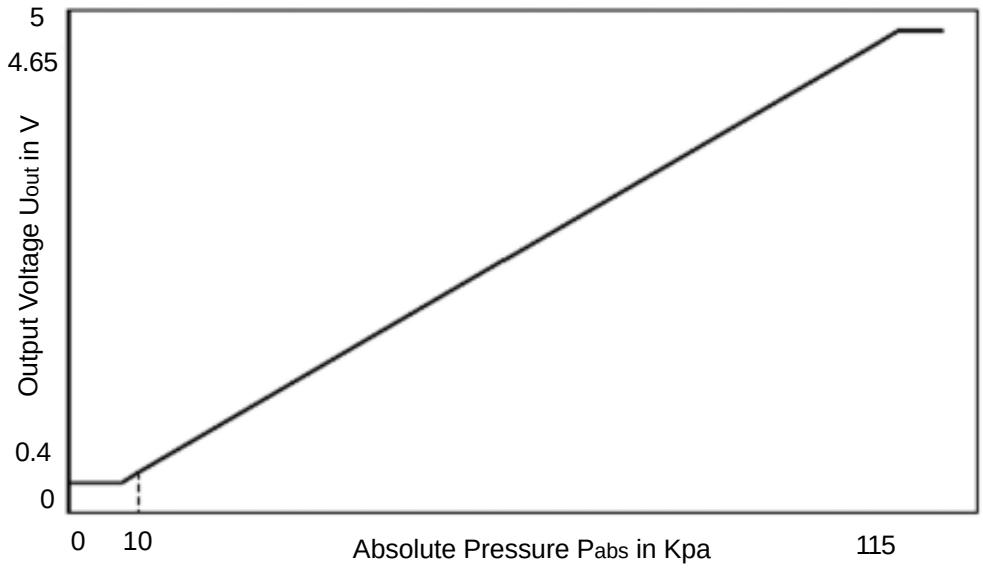
MAP Sensor Wiring Diagram

THE RIGHT DRAWING IS THE PERMIT FITTING LIMIT,IN THIS WAY CAN ENSURE THERE IS NO CONDENSED WATER INSIDE THE SENSOR,THE CONDENSED WATER CAN DESTROY SENSOR INNER PRESSURE-SENSING DEVICE.



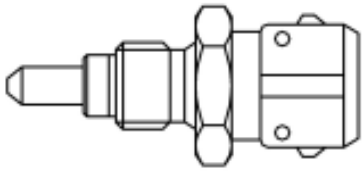
Allowed Range of Setting Angle

THE PICTURE BELOW IS THE RECIPROCAL DIAGRAM DRAWING FOR PRESSURE AND OUTPUT VOLTAGE.
MONITOR PRESSURE RANGE:10-115kPa.



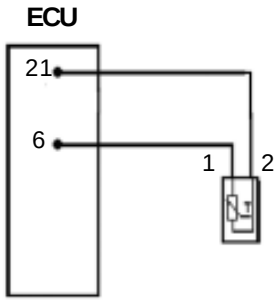
(4)INTAKE AIR TEMPERATURE SENSOR(IAT Sensor):

THIS SENSOR IS A NEGTIVE TEMPERATURE COEFFICIENT (NTC) THERMISTANCE,IT'S RESISTANCE VALUE DECREASE WHEN THE COOLANT TEMPERATURE INCREASE,BUT IT IS NOT LINEAR RELATION.THE SENSOR HAVE 2 PINS,AND THEY CAN BE EXCHANGED USING.



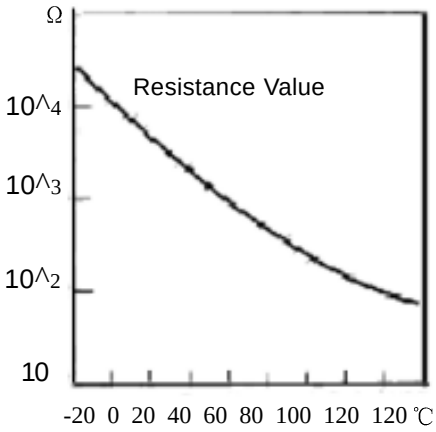
IAT Sensor

THE RIGHT DRAWING IS THE WIRING DIAGRAM FOR SNESOR&ECU.



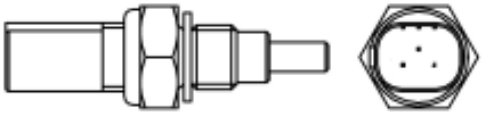
IAT Sensor Wiring Diagram

THE RIGHT DRAWING IS FOR SENSOR TEMPERATURE-RESISTANCE PROPERTY LIST.



(5)WATER TEMPERATURE SENSOR:

THIS SENSOR IS A NEGTIVE TEMPERATURE COEFFICIENT (NTC) THERMISTANCE,IT'S RESISTANCE VALUE DECREASE WHEN THE COOLANT TEMPERATURE INCREASE,BUT IT IS NOT LINEAR RELATION.ONE GROUP PROVIDE TO ECU,MONITOR ENGINE HEAT CONDITION.THE OTHER GROUP PROVIDE TO THE METER,MONITOR WATER TEMPERATURE.

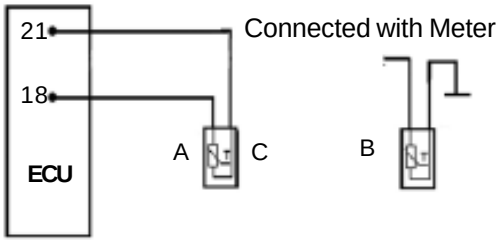


Water Temp Sensor

A AND **C IN ONE GROUP, THEY PROVIDE WATER TEMPERATURE TO ECU.**

B ANDTHREADED PORTION IN ONE GROUP,THEY PROVIDE WATER TEMPERATURE TO THE METER.

THE RIGHT DRAWING IS THE WIRING DRAWING FOR SENSOR,ECU AND METER.



Connected with ECU

THE RIGHT DRAWING IS B END AND CRUST TEMPERATURE PROPERTY LIST,SIGNAL PASS TO THE METER.

Temp Range (℃)	B to Case End Resistance(Ω)
50 ± 0. 2	176-280
80 ± 0. 2	63.4-81.4
110 ± 0. 2	24.6-30.6

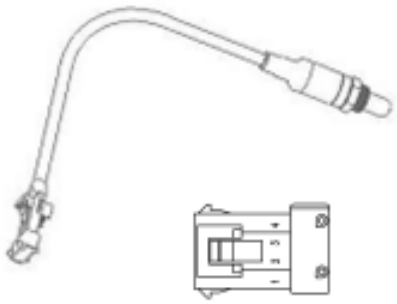
THE RIGHT DRAWING IS END A,C AND THE TEMPERATURE PROPERTY LIST, SIGNAL PASS TO THE ECU.

Temp Range (℃)	A,C to Case End Resistance(Ω)
-20 ± 0. 1	13.71-16.94
25 ± 0. 1	1.825-2.155
80±0. 1	0.303-0.326
110 ± 0. 1	0.1383-0.1451

(6)OXYGEN SENSOR:

THIS SENSOR USED IN ELECTRONIC CONTROL FUEL INJECTION EQUIPMENT FEEDBACK SYSTEM,TO REALIZE CLOSED-LOOP CONTROL,RAISE ECU CONTROL THE AIR-FUEL DELIVERY RATIO.

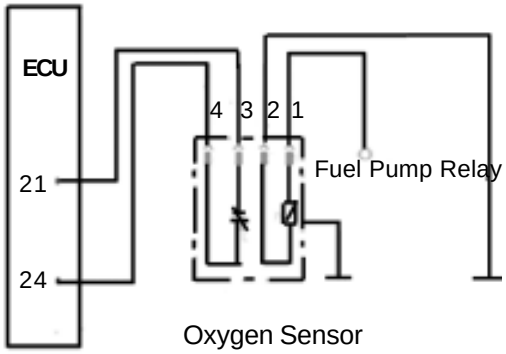
IT INSTALLED IN THE EXHAUST-PIPE,MEASURING WASTE GAS OXYGEN CONTENT,DEFINITE IF THE GAS AND AIR COMPLETE BURNT,SO AS TO ENSURE UNIT TRIPLET CATALYTIC CONVERTER HAVE MAXIMUM CONVERSION EFFICIENCY TO EXHAUST HC,CO AND NO_x.



THE PINS FUNCTION:

1.CONNECT HEATING POSITIVE SOURCE(WHITE).
2. CONNECT HEATING NEGATIVE SOURCE(WHITE).
3.OUTCOMING SIGNAL NEGATIVE POLE(GRAY).
4.OUTCOMING SIGNAL POSITIVE POLE(BLACK).

THE RIGHT DRAWING IS THE WIRING DIAGRAM FOR SENSOR AND ECU.

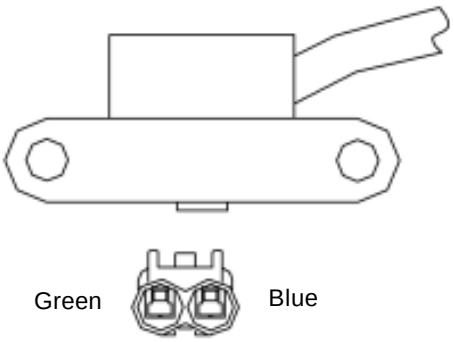


THE BELOW SHEET IS THE SENSOR PERFORMANCE CHARACTERISTIC VALUE.

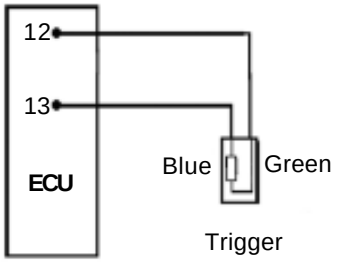
Quantity	New		After 500Hours Bench Test	
Performance Data Establish Exhaust Temp	350℃	850℃	350℃	850℃
Sensor Voltage(mv) When λ =0.97 (CO=1%)	840 ± 70	710 ± 70	840 ± 80	710 ± 70
Sensor Voltage(MV) When λ =1.10 (CO=1%)	20 ± 50	55 ± 30	20 ± 50	40 ± 40
Sensor Internal Resistance(kΩ)	≦ 1.0	≦ 0.1	≦ 1.5	≦ 0.3
Response Time(ms) (600mv-300mv)	≦ 150	≦ 150	≦ 300	≦ 200
Response Time(ms) (300mv-600mv)	≦ 150	≦ 150	≦ 300	≦ 200

(7)TRIGGER:

PROVIDE ENGINE ROTATE SPEED INFORMATION TO ECU,ECU DETERMINE IGNITION ANGLE,FUEL IN JECTION ANGLE ACCORDING TO THIS INFORMATION.



THE RIGHT DRAWING IS THE WIRING DIAGRAM FOR TRIGGER AND ECU.

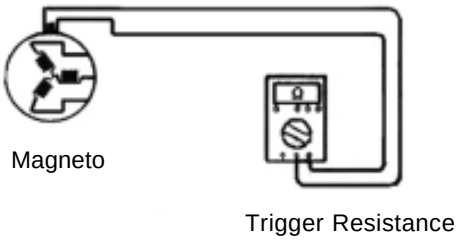


TESTING THE THRIGGER RESISTANCE VALUE.

- ADJUST **MULTIMETER** TO 1Ω100 Ω ;
  TRIGGER WINDING RESISTANCE:100-130 Ω（20℃）
- IF THE TRIGGER RESISTANCE DONOT IN ABOVE RANGE,REPLACE WITH A NEW ONE.

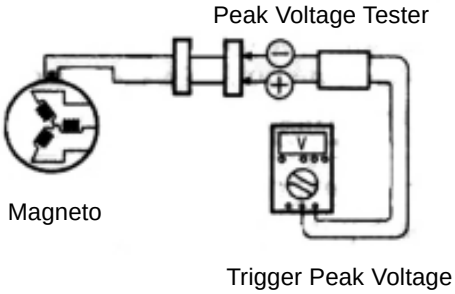
MEASURING TRIGGER PEAK VOLTAGE VALUE.

- CONNECT MULTIMETER AND PEAK VOLTAGE ADAPTER ACCORDING TO THE RIGHT DRAWING:
  +PROBE: GREEN LEAD WIRE
  -PROBE: BLUE LEAD WIRE



ATTENTION:
WHEN USE PEAK VOLTAGE ADAPTER,REFERS TO OPERATION MANUAL.

- ADJUST MULTIMETER TO ALTERNATE **V**
- ADJUST THE GEAR TO NEUTRAL,ADJUST IGNITION SWITCH TO"**ON**".
- PRESS ON STARTING BUTTON AND LET THE EN GINE RUNNING FOR FEW SECONDS,THEN START TO MEASURE:
  THRIIGER COIL PEAK VOLTAGE.
- REPEATED TIMES MEASURE, GET THE HIGHEST TRIGGER COIL PEAK VOLTAGE VALUE.;
  TRIGGER COIL PEAK VOLTAGE:≥2V（300rpm).



- IF THE TRIGGER PEAK VOTAGE DONOT IN THE ABOVE RANGE,REPLACE WITH A NEW ONE.

(8)ODOMETER SENSOR:

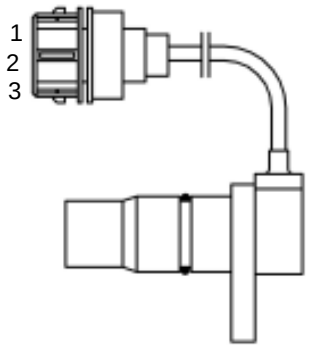
PROVIDE ENGINE OUTPUT SHAFT SPEED TO ECU, ECU JUDGE VEHICLE SPEED ACCORDING TO THIS INFORMATION.IT IS A KIND OF HALL SWITCH COMPONENTS,IT OUTPUT SQUARE WAVE VIA INDUCTION FIELD.

PINS FUNTION:

1.GROUNDING

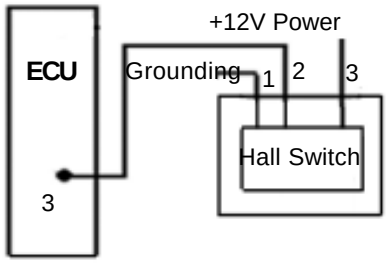
2.OUTPUT SQUARE WAVE VOLTAGE SIGNAL(＞IN PUT POWER VOLTAGE 80%).

3.POWER+DC12V.



Odometer Sensor

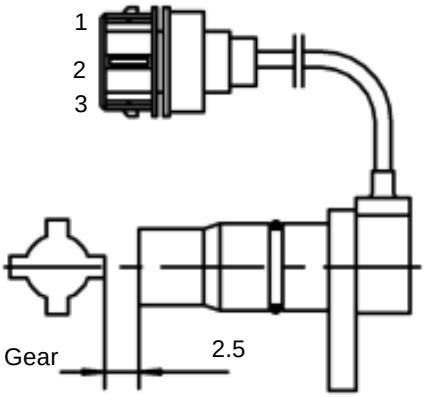
THE RIGH IS THE WIRING DRAWING OF SENSOR AND ECU.



Odometer Sensor Wiring Diagram

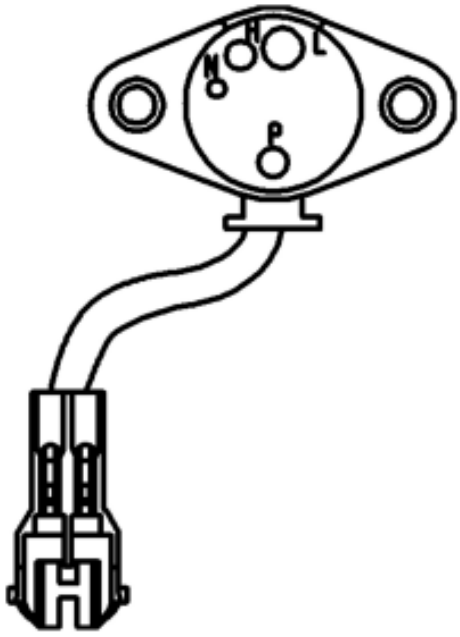
ODOMETER SENSOR TESTING

- GROUNDING FOOT 1,CONNECT FOOT 3+12V.
- FIXED ONE GEAR TO ODOMETER ACCORDING TO THE RIGHT DIAGRAM DISTANCE(**2.5mm**).
- ADJUST MULTIMETER TODCV.
- ROTATE THE GEAR SLOWLY,MEASURE THE VOLT AGE VALUE BETWEEN FOOT 2 AND FOOT 3 TO SEE IF IT IS VARY FROM 0V,12V.
- IF NO CHANGES, THEN THE SENSOR IS DAMAGED, YOU WILL BE REQUIRED TO REPLACE WITH A NEW ONE.



(9)GEAR SENSOR CLUSTER:

PROVIDE GEAR INFORMATION TO THE METER,SOASTO AT THE SAME TIME,COORDINATE WITH CABLE AS STARTING PROTECTION.



Gear Sensor

FUNCTIONS OF THE FOOTS:

YELLOW/BLUE-L(UNDERDRIVE)

ORANGE/BLUE-H(HIGH POSITION)

YELLOW/BLACK-P(PARK POSITION)

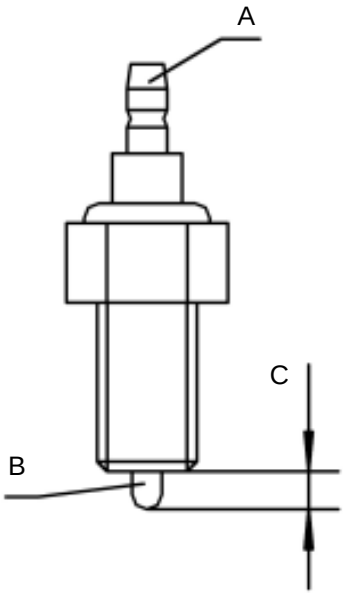
WHITE/YELLOW-N(NEUTRAL POSITION)

- WHEN EACH OF THE FOUR GEAR IN A CERTAIN POSITION,GEAR CORRESPONDING FOOT CON DUCT TO THE ENGINE COVER, OR ELSE IT NON-CONDUCTION WITH THE ENGINE COVER.

(10)REVERSE GEAR ASSEMBLE:

PROVIDE GEAR REVERSE INFORMATION TO ECU AND METER,THE ECU RESTRICT VEHICLE SPEED ACCORDING TO THIS INFORMATION.

- NORMALLY,**A**,**B POINT CONDUCTION,DONOT CONDUCT WITH THE CASE.**



- NORMALLY, C LENGTH IS 3.5mm,IF C LENGTH ＜3mm,OR IF B SLIDE BLOCK,YOU HAVE TO CHANGE IT TO A NEW ONE.
- WHEN ENGINE BACK GEAR, A POINT NON-CONDUCTION WITH THE ENGINE CASE, OR ELSE IT IS CONDUCT WITH THE CASE.

(11)FUEL PUMP ASSY:

THE OIL FUEL PUMP ASSY COMBINED OF FUEL PUMP,PLASTIC BRACKET,PREFILTRATION,PRES SURE REGULATING VALVE. IT DELIVER THE FUEL TO THE ENGINE WITH A CERTAIN OIL PRESSURE AND FLOW.

FUNCTIONS OF THE FOOT:

1.BLUE(GROUNDING)

2.RED(CONNECT THE OIL PUMP RELAY OUTPUT ENDING)

PERFORMANCE PARAMETER:

FLOW:**35L/h**

PRESSURE REGULATING VALVE OPENING PRESSURE:0.3±0.01MPa

- THIS FUEL PUMP ASSY ALL USED INSIDE THE FUEL TANK:
- DONOT RUN THE FUEL PUMP ASSY IN DRY;
- HANDLE GENTLY, DONOT DROP THE FUEL PUMP ASSY ONTO THE GROUND.

THE RIGHT DIAGRAM IS THE WIRING DIAGRAM OF THE OIL PUMP ASSY,OIL PUMP RELAY,ECU.

- BATTERY SUPPLY POWER VIA FUEL PUMP RELAY, ELECTRIC OIL FUEL PUMP CIRCUIT CLOSE ONLY WHEN STARTING AND THE ENGINE RUNNING.

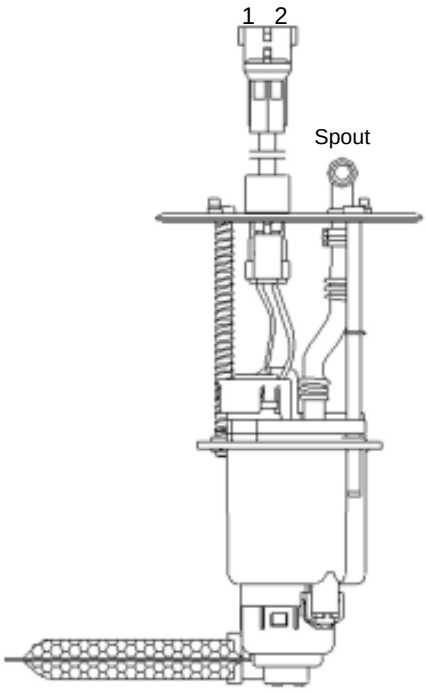
MEASURING THE FUEL PRESSURE:

- CONNECT FUEL PRESSURE GAUGE TO THE FUEL PUMP FUEL DISCHARGE PORT,LOCK WITH CLAMP,ENSURE THERE IS NO LEAKAGE IN CONNECT AREA:
- LINK THE CIRCUIT ACCORDING TO THE ABOVE DIAGRAM;
- TURN OFF THE IGNITION SWITCH,AND KILL SWITCH;
- AT THIS MOMENT,THE FUEL PUMP WILL WORKING FOR 5 SECONDS,WHEN IT STOP,THE FUEL PRESSURE SHALL REACH THE AUTHORIZED PRESSURE,OR ELSE,REPLACE THEENTIRE FUEL PUMP ASSY;
- WHEN STOPED OPERATION,PRESSURE HOLDING AT LEAST 0.2MPa 5 MINUTES, IF NOT, REPLACE THE FUEL PUMP ASSY.

OIL FUEL PIPE PRESSURE RELIEF:

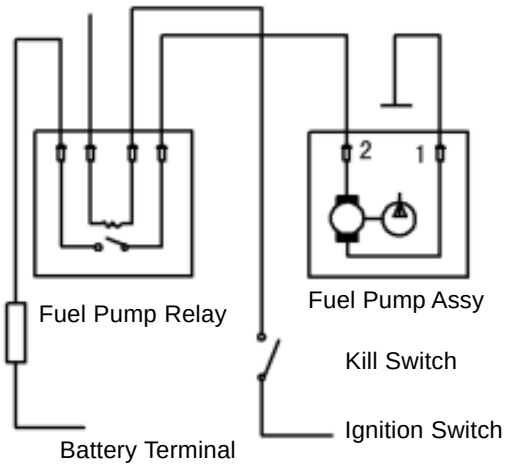
BECAUSE OF THE HIGH PRESSURE OF FUEL SUPPLY,THE FUEL PIPES ARE ALL HIGH PRESSURE RESISTANCE PIPE.EVEN IF THE ENGINE DOES NOT WORK,THERE IS STILL HIGH PRESSURE ON THE FUEL CHANNEL,THEREFOR,DONOT DISMANTLE THE FUEL PIPE DURING SERVICING EASILY.
BEFORE SERVICE THE FUEL SYSTEM,YOU REQUIRED TO DO FUEL PRESSURE RELIEF,THE METHOD IS AS BELOW:

REMOVE FUEL PUMP RELAY,START THE ENGINE AND RUN ENGINE ON IDLE UNTILL THE ENGINE GO OUT IT SELF.



Fuel Pump Assy

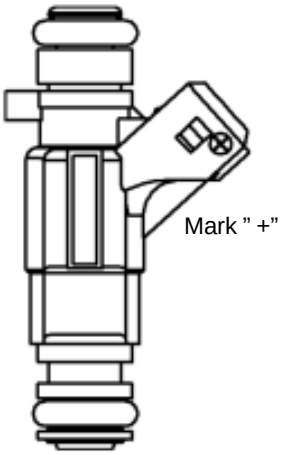
Connected with ECU PIN 22



(12)FUEL INJECTOR:

FUEL INJECTOR ONE END INSTALLED IN SEAT,THE OTHER END CONNECT WITH THE FUEL PIPE VIA FUEL INJECTOR CAP.ACCORDING TO THE ECU INSTRUCTION,IT SPRAY FUEL IN FIXED TIME.SO AS TO SUPPLY OIL TO THE ENGINE AND ATOMIZING. THIS FUEL INJECTOR APPLY QUADRIPUNTAL,DO NOT TURN AFTER FIXED THE CLAMP.

Connected with Fuel Injector Cap



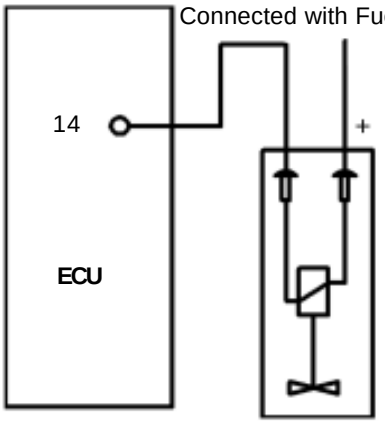
Connected with Fuel Injector Seat

FUNCTION OF PINS:

- ONE SIDE OF THE PLUG **MARK+**CONNECT FUEL PUMP RELAY OUTPUT END,
  WITHOUT MARK SIDE CONNECT ECU PIN 14.

OIL ATOMIZER RESISTANCE:$12 \pm 1\ \Omega$ （20℃）

Connected with Fuel Pump Relay



Fuel Injector

THE RIGHT IS THE WIRING DIAGRAM FOR FUEL INJECTOR AND ECU.

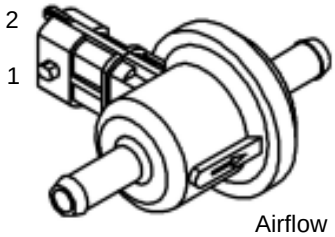
FUEL INJECTOR INSTALLATION:

- INSTALL THE FUEL INJECTOR BY PUSHING IN HAND.
- WHEN DISASSEMBLE AND ASSEMBLING THE FUEL INJECTOR,YOU MUST REPLACE THE O RING.
- WHEN DISMANTLING FUEL INJECTOR, IF NECESSARY,DO PRESSURE RELIEF IN ADVANCE.
- CHECK FOR FUEL LEAKS AFTER INSTALLING.

(13)IDLE SPEED CONTROL VALVE (CARBON TANK CONTROL VALVE):

CONTROL PASS-BY AIR FLOW. ECU CONTROL THE IDLE SPEED VALVE ACCORDING TO THE INFORMATION OF ENGINE LOAD,THE ELECTRICAL PULSE DURATION AND FREQUENCY:(DUTY RATIO).THE IDLE SPEED VALVE HAS DIFFERENT AIR FLOW UNDER DIFFERENT PRESSURE,SO IT MUST BE CONNECTED ACCORDING TO PRESCRIPTIVE METHOD,OR ELSE WILL CAUSE INCORRECT IDLE SPEED,WHEN WITHOUT ELECTRICAL PULSE,IDLE SPEED VALVE CLOSE.

Connected with Throttle Body



Airflow Direction

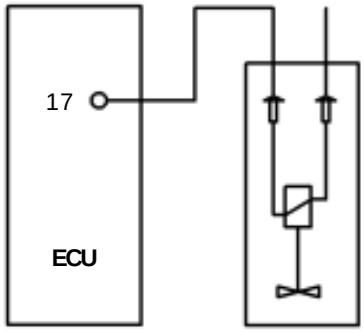
Connected with Air Filter

FUNCTION OF PINS:

1.CONNECT PIN 17.

2.CONNECT OIL PUMPRELAY OUTLET END.

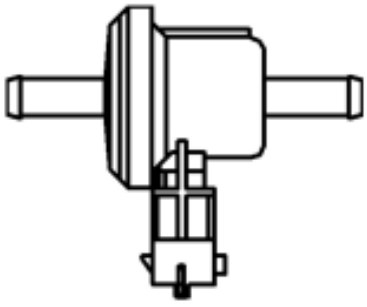
THE RIGHT IS THE WIRING DIAGRAM FOR IDLE SPEED VALVE AND ECU.



Idle Air Control Valve

- WHEN FIXING THE IDLE SPEED CONTROL VALVE,IT CANNOT BE INSTALLED LIKE THE RIGHT DIAGRAM (CONNECTOR **VERTICALLY DOWNWARD) TO AVOID DESTROY THE ELECTRONIC COMPONENT**.

- TO AVOID SOLID-BORNE SOUND TRANSMISSION, YOU CAN INSTALL THE IDLE AIR CONTROL VALVE SUSPENDED IN THE TUBE,OR USE RUBBER BOOT TO FIX IT TO THE ENGINE OR THE FRAME.



Incorrect Installation

IDLE SPEED CONTROL VALVE PARAMETER LIST:

Quantity	Value		Max	Unit
	Min	Typical		
Rated Voltage		13.5		V
Resistance at 20℃		16		Ω
Rated Current		0.85		A
Pulse Control Frequency				HZ
Typical Pulse Control Width		≦ 8		ms
Pressure Difference =700mbar Share Air Ration 100% Flow		5.00		m3 /h

(14)IGNITION COIL:

IGNITION COIL CHANGE THE PRIMARY WIND ING LOW VOLTAGE INTO SECONDARY WINDING HIGH VOLTAGE,THROUGH SPARK PLUG DISCHARGE TO CREAT SPARK,FIRING THE FUEL AND GAS MIXTURE.

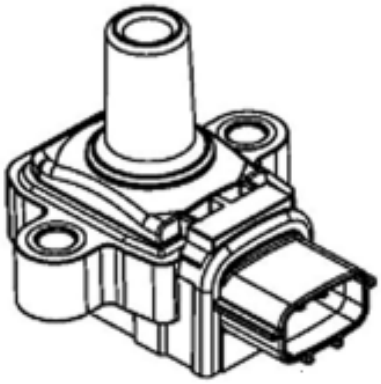
FUNCTION OF PINS:

1.GROUNDING.

2.CONNECT POWER+.

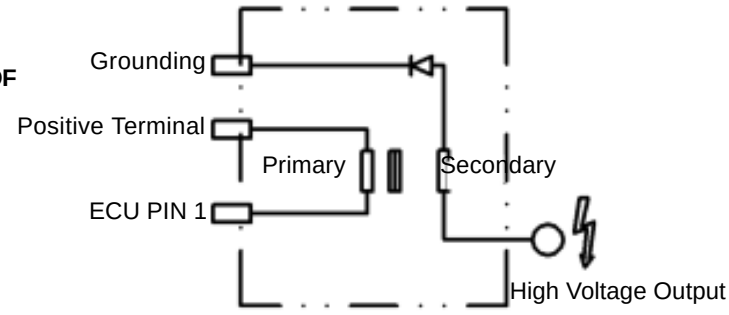
3.CONNECT ECU 1 POINT;

Connected with High Voltage Cable



Ignition Coil

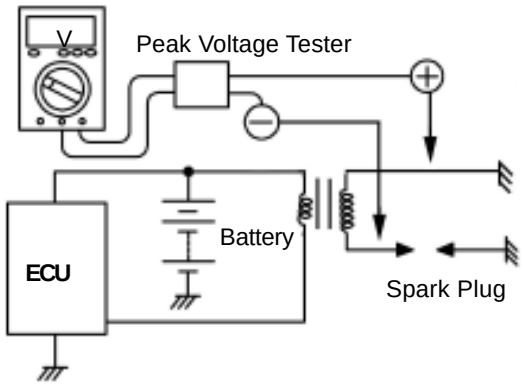
THE RIGHT IS THE CONNECTION CIRCUIT DIAGRAM OF IGNITION COIL AND ECU.



Ignition Coil Wiring

MEASURING SECONDARY IGNITION VOLTAGE:

- CONNECT THE ENGINE ACCORDING TO THE ELEC TRONIC-SPRAY ELEMENTARY DIAGRAM.
- CONNECT THE PEAK VOLTAGE GUAGE ACCORD ING TO THE RIGHT DIAGRAM.
- START THE ENGINE.
- AFTER STARTS,THE SECONDARY IGNITION VOLT AGE SHOULD BE ＞**15000**V.



IGNITION COIL PARAMETER LIST:

Quantity		Value			Unit
		MIN	Typical	MAX	
Rated Voltage			14		V
Working Voltage		6		16.5	V
Resistance (20-25℃)	Primary Winding	0.74	0.76	0.78	Ω
	Secondary Winding	10.1	10.6	11.1	k Ω
Primary Current			7		A

ELECTRONIC FUEL INJECTION SYSTEM FAULT SELF-DIAGNOSIS

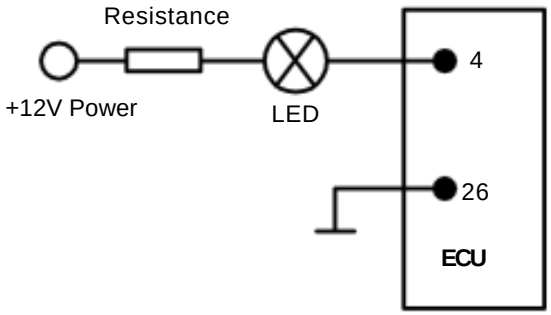
ECU CONTINUOUSLY MONITOR THE SENSOR,ACTUATOR,RELEVENT CIRCUIT,TROUBLE LAMP,BATTERY VOLTAGE ETC,EVEN THE ECU ITSELF.ALSO THE SENSOR OUTPUT,ACTUATOR DRIVING SIGNAL,INTERNAL SIGNAL(SUCHAS CLOSED-LOOP CONTROL, COOLANT TEMPERATURE,IDLING SPEED CONTROL,BATTERY VOLTAGE CONTROL ETC),DO THE RELIABILITY MEASUREMENT. ONCE DISCOVER SOME WHERE BREAK DOWN,OR SOME SIGNAL VALVE UNTRUSTED,THE ECU WILL IMMEDIATELY SET UP FAULT RECORD INFORMATION IN RAM TROUBLE MEMORY.THE FAULT INFORMATION STORE AS TROUBLE CODE,AND DISPLAY THE FAULT IN IT'S EMERGENCE SEQUENCE. THE FAULT CANBE DIVIDED INTO TWO TYPES¡°STEADY FAULT¡±AND"RANDOM FAILURE" ACCORDING TO IT¡¯S EMERGENCE FREQUENCY(SUCH AS CAUSED BY BRIEF WIRE TURNOFF OR BAD CONNECTION OF THE CONNECTOR.)

THROUGH DIAGNOSTIC EQUIPMENT AND THE TROUBLE LAMP YOU CAN FIND THE TROUBLE PART QUICKLY.

ELECTRONIC FUEL INJECTION SYSTEM FAULT DIAGNOSIS MAINLY APPLY TROUBLE LAMP AND DIAGNOSTIC EQUIPMENT.

(1)TROUBLE LAMP(MILLAMP)

TROUBLE LAMP FIXED IN THE METER DESPLAY BOARD,ADOPTING LED,BY MEANS OF DIFFERENT FREQUENCY STAND FOR THE TROUBLE CODE.



THE RIGHT IS THE WIRING DIAGRAM FOR TROUBLE LAMP AND ECU.CURRENT FLOW INTO ECU 4 PIN SHOULD BE LESS THAN 0.5A.

TROUBLE LAMP BLINK PRINCIPLE:

a: IN BLINK CODE MODE,AND ALSO THE TROUBLE MEMOY TROUBLE FREE:

IF ECU MONITOR THAT THE MIL LAMP IN BLINK CODE MODE, THE TROUBLE LIGHT WILL FLICKER TO SHOW THE TROUBLE CORRESPONDING Pcode CODE. SINCE IGNITE ECU,MIL WILL CONTINUE BLINK 4 SECONDS,THEN HAVE A 1 SECOND SPAN, MIL BLINK WITH 2 HZ FREQUENCY TO SAY TROUBLE FREE. UNTILL START THE ENGINE,FIND OUT THE ROTATE SPEED.

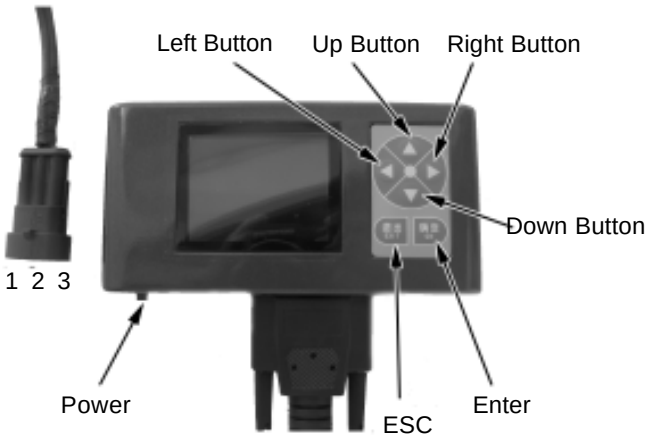
b: IN CODE BLINK MODE,AND THE TROUBLE MEMORY SHOWS AT FAULT.

IF ECU MONITOR THAT THE MIL LAMP IN CODE BLINK MODE,THE TROUBLE LAMP WILL BLINK TO SHOW THAT THE TROUBLE MEMORY CORRESPONDING Pcode CODE.SINCE IGNITE ECU INITIALIZATION,MIL WILL LIGHT 4 SECONDS,THEN HAVE A 1 SECOND SPAN,MIL SHOW THE MEMORY TROUBLE CODE THROUGH BLINK CODE Pcode.IF ALL THE TROUBLES ENTERED THE MEMORY SHOWED BY MIL LAMP VIA BLINK CODE MODE, MIL EXTINGUISH,UNTILL EXIT BLINK CODE MODE.
BLINK CODE MODE REQUIRES K LINE GROUNDING.

C: READ TROUBLE INFORMATION THROUGH THE BLINK CODE THRN ON THE IGNITION SWITCH,K LINE GROUND AFTER 2.5 SECONDS,IF ECU TROUBLE MEMORY HAVE TROUBLE CODE, AT THE MOMENT, ENGINE MIL TROUBLE LAMP OUTPUT P-CODE VALUE.SUCH AS:P0203 BLINK MODE IS:BLINK 10 TIMES CON-TINUOUSLY-INTERMISSION-BLINK 3 TIMES CONTINUED.

(2)DIAGNOSTIC EQUIPMENT:IT HAVE THREE PINS, POWER,GROUNDWIRE AND DATA K LINE,CONNECT WITH THE CORRESPONDING PINS IN ECU.

THE RIGHT IS THE DIAGNOSTIC EQUIPMENT OPERATION FUNCTIONS INDICATOR DIAGRAM.SPECIFIC OPERATION AND IT'S FUNCTIONS PLEASE REFERS TO THE DIAGNOSTIC EQUIPMENT OPERATING MANUAL.

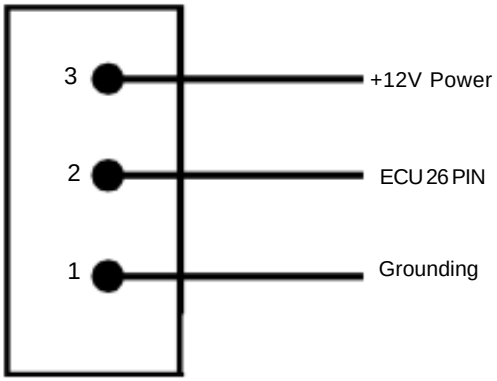


PINS FUNCTIONS:

1.ECU 26PIN

2.GROUNDWIRE

3.+12V POWER



KEY-PRESS FUNCTIONS:

LEFT-HAND BUTTON:UPWARD **TURN OVER.**

UPPER KEY:MENU SELECTION,UPWARD ROLLING TEXT.

RIGHT-HAND BUTTON:BACKWARD TURN OVER.

DOWN KEY:MENU SELECTION,DOWNWARD ROLLING TEXT.

CONFIRMATION KEY:ENTER OR START CURRENT OPERATION;
SELECT CURRENT MENU SELECTION;

ESC ESCAPE:CANCEL OR STOP CURRENT OPERATION;
RETURN TO PREVIOUS PAGE;

DIAGNOSTIC EQUIPMENT FUNCTION:

(1)EDITION INFORMATION DESPLAY:

ENGINE INFORMATION,ECU HARDWARE,ECU SOFTWARE.

(2)TROUBLE DISPLAY

INLET PRESSURE SENSOR,INTAKE AIR TEMPERATURE SENSOR,ENGINE TEMPERATURE SENSOR,THROTTLE POSITION SENSOR, OXYGEN SENSOR,OXYGEN SENSOR HEATING CIRCUIT,AIR-FUEL DELIVERY RATIO,FUEL INJECTOR,FUEL PUMP RELAY,REVOLUTION SPEED SENSOR,VEHICLE SPEED SIGNAL,IDLING SPEED,IDLE AIR CONTROL,SYSTEM VOLTAGE,ECU,TROUBLE LAMP.

(3)ENGINE PARAMETER DISPLAY

BATTERY VOLTAGE,ENGINE SPEED,IDLE SPEED,VEHICLE SPEED,ENGINE TEMPERATURE,ENGINE TEMPERATURE SENSOR SIGNAL VOLTAGE,INLET TEMPERATURE,INLET AIR TEMPERATURE SENSOR,INLET PRESSURE,AIR INPUT,MAGNETIC STEPPING MOTOR TARGET LOCATION,THROTTLE POSITION SENSOR SIGNAL PRESSURE,THROTTLE OPENING,RELATIVE THROTTLE POSITION,CARBON TANK CONTROL VALVE DUTY RATIO,CHARGING TIME,FUEL SPOUT PILSE WIDTH,IGNITION ADVANCE ANGLE,OXYGEN SENSOR SHORT-TERM CORRECTION,OXYGEN SENSOR VOLTAGE,OXYGEN SENSOR LONG TERM CORRECTION,ENGINE RELATIVE LOAD,CARBON TANK CONTROL RELATIVE FUEL DELIVERY,CARBON PURIFYING,CARBON LOAD,IDLING ACTUATOR TEV OPENING, AMBIENT PRESSURE,ELEVATION CORRECTION FACTOR,OIL SPOUT PHASE,RUNTIME.

(4)ELECTRONIC FUEL INJECTION SYSTEM STATUS DISPLAY

IGNITION TERMINAL OPEN UP,MAIN RELAY OPERATION,OIL FUEL PUMP OPERATION,REACH IDLING ROTATE SPEED,REACH ENGINE WORK TEMPERATURE,VEHICLE RUNNING,IDLE SPEED WORKING CONDITION,FULL LOAD WORKING CONDITION,ACTIVE DECELERATE OIL REDUCTION,ACTIVATE ACCELERATION CROWDING,OIL SPOUT CLOSED-LOOP CONTROL ACTIVATION,DECELERATION OIL-BREAK,lambda CONTROL ACTIVATE,MIXTURE GAS SELF-LEARNING ACTIVATION,TROUBLE LAMP STATE,MIL BLINK.

(5)ACTUATOR EXPERIMENT FUNCTION

TROUBLE LAMP,OIL FUEL PUMP,MAGNETIC STEPPING MOTOR,CARBON TANK CONTROL VALVE,IGNITION,FUEL SPOUT.

TROUBLE CODE LIST:

REF	TROUBLE CODE	INSTRUCTION
1	P0030	OXYGEN SENSOR HEATING CONTROL CIRCUITOPEN CIRCUIT
2	P0031	OXYGEN SENSOR HEATING CONTROL CIRCUITSHORT TO GOUND
3	P0032	OXYGEN SENSOR HEATING CONTROL CIRCUITSHORT CIRCUIT TO POWER
4	P0053	OXYGEN SENSOR HEATING INTERNAL RESISTANCE UNREASONABLE
5	P0105	INLET PRESSURE SENSOR SIGNAL NO CHANGE（ICE UP）
6	P0106	INLET PRESSURE SENSOR UNREASONABLE
7	P0107	INLET PRESSURE SENSOR SHORT CIRCUIT TO GROUND
8	P0108	INLET PRESSURE SENSOR SHORT CIRCUIT TO POWER
9	P0112	INLET AIR TEMPERATURE SENSOR SIGNAL VOLTAGE TOO LOW
10	P0113	INLET AIR TEMPERATURE SENSOR SIGNAL VOLTAGE TOO HIGH
11	P0116	ENIGNE COOLANT TEMPERATURE SENSOR UNREASONABLE
12	P0117	ENIGNE COOLANT TEMPERATURE SENSOR CIRCUIT VOLTAGE TOO LOW
13	P0118	ENIGNE COOLANT TEMPERATURE SENSOR CIRCUIT VOLTAGE TOO HIGH
14	P0122	THROTTLE POSITION SENSOR CIRCUIT VOLTAGE UNDER LIMINAL VALUE
15	P0123	THROTTLE POSITION SENSOR CIRCUIT VOLTAGE EXCEED LIMINAL VALUE
16	P0130	OXYGEN SENSOR SIGNAL UNREASONABLE
17	P0131	OXYGEN SENSOR SIGNAL CIRCUIT VOLTAGETOO LOW
18	P0132	OXYGEN SENSOR SIGNAL CIRCUIT VOLTAGETOO HIGH
19	P0134	OXYGEN SENSOR CIRCUIT SIGNAL TROUBLE
20	P0201	1 CYLINDER OIL ATOMIZER CONTROL CIRCUIT OPEN CIRCUIT
21	P0261	1 CYLINDER OIL ATOMIZER CONTROL CIRCUIT SHORT CIRCUIT TO GOUND
22	P0262	1 CYLINDER OIL ATOMIZER CONTROL CIRCUIT SHORT CIRCUIT TO POWER
23	P0321	TRANSIENT SPEED SIGNAL REFERENCE POINT TROUBLE
24	P0322	NO TRIGGER(VEHICLE SPEED) PULSE SIGNAL (OPEN CIRCUIT OR SHORT CIRCUIT)
25	P0501	VEHICLE SPEED SENSOR SIGNAL UNREASONABLE
26	P0506	IDLE SPEED CONTROL ROTATING SPEED LOWER THAN TARGET IDLE SPEED
27	P0507	IDLE SPEED CONTROL ROTATING SPEED HIGHER THAN TARGET IDLE SPEED
28	P0560	SYSTEM BATTERY VOLTAGE SIGNAL UNREASONABLE
29	P0562	SYSTEM BATTERY VOLTAGE TOO LOW
30	P0563	SYSTEM BATTERY VOLTAGE TOO HIGH
31	P0602	ECU CODING TROUBLE
32	P0627	OIL PUMP RELAY CONTROL CIRCUIT OPENING
33	P0628	OIL PUMP RELAY CONTROL CIRCUIT SHORTCIRCUIT TO GROUND
34	P0629	OIL PUMP RELAY CONTROL CIRCUIT SHORTCIRCUIT TO POWER
35	P0650	MIL LAMP DRIVING STAGE TROUBLE
36	P2177	AIR FUEL RATIO CLOSED-LOOP CONTROL SELF-LEARNING VALUE EXCEED UPPER LIMIT
37	P2178	AIR FUEL RATIO CLOSED-LOOP CONTROL SELF-LEARNING VALUE UNDER LOWER LIMIT
38	P1117	IDLE AIR CONTROL TEV SHORT CIRCUIT TO GROUND
39	P1118	IDLE AIR CONTROL TEV OPEN CIRCUIT

Overhaul Information

Operation instructions

Warning

- Headlight bulb will be very hot when it is turned on. Do not touch it after it is just turned off. Operation should be done when the bulb is cooled down.
- Inspection of water temperature alarm may use heat source and liquid of high temperature. Do not put flammable matters nearby and take care not to get burnt.
- The temperature of headlight is quite high when turned on. Replacing with bare hand or stained glove willcause oil stains on the glass face which may form hot spot and cause deformation of glass face and damage to bulb.
- Pay attention to the following when replacing the bulb.

–Do not replace the bulb when it is turned on. Keep ignition switch in the OFF position, and replace after the bulb is cooled down.

-Replace the bulb with hands in clean gloves to avoid oil stains on the glass surface.

-Clean the glass with a clean rag dipped in alcohol or isoamyl acetate in case of any oil stains on the glass surface.

- If the Inspection has to be done with battery, check if the battery is normal.
- Inspection of switch continuity can be done without removing the switches from the vehicle.
- After the inspecting and overhauling of each part, cables and wires should be routed properly (chapter 1)
- Refer to Chapter 2 for removal and installation of taillight and rear turning lights

13

Check standard

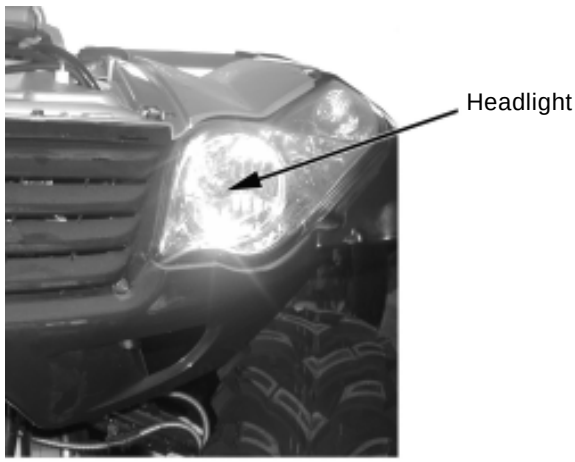
Item		Standard
Fuse	Main	20A
	Sub-fuse	10A×2　15A×2
Light、Bulb	Headlight（Hi / Lo）	12V-35/35W
	Brake light / Taillight	12V-21/5W
	Turning light	12V-10W×4
	Dashboard indicator	ϕ5 LED
	Indicators	LCD

Replacing Bulb

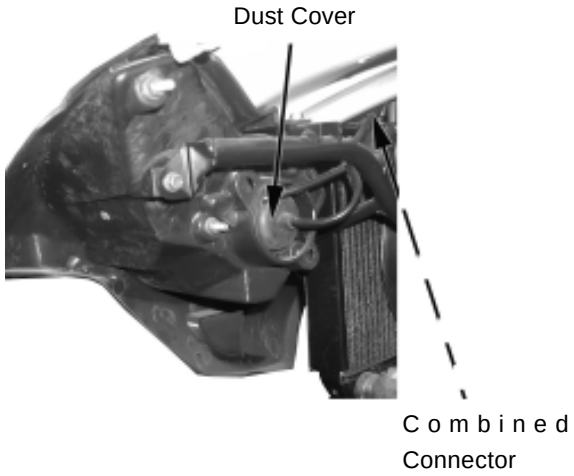
Headlight Bulb

Cautions

Headlight bulb will be very hot when it is turned on. Do not touch it after it is just turned off. Operation should be done when the bulb is cooled down.



Remove headlight
(→ 13–5)

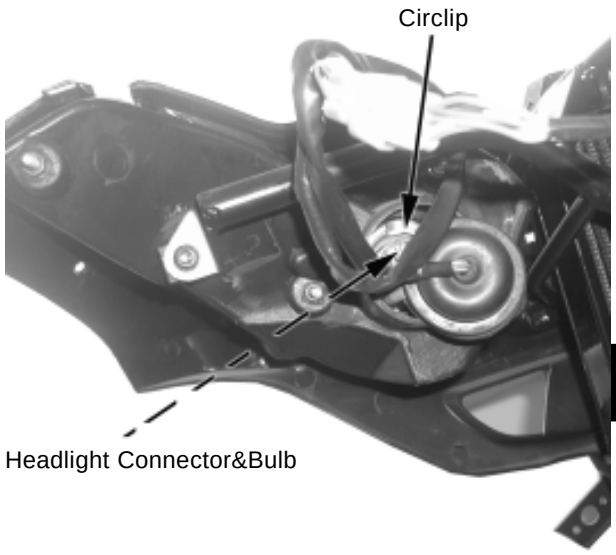


Disconnect headlight.

Remove dust-proof cap, headlight connector, circlip and replace with a new bulb.

Warning:

Wear clean gloves when replacing bulb.
Oil stains on the glass surface may cause break of bulb. Clean the stained surface with alcohol or isoamyl acetate.
Make sure that the three pins of the bulb should be in line with the three positioning holes in the socket when replacing the bulb.



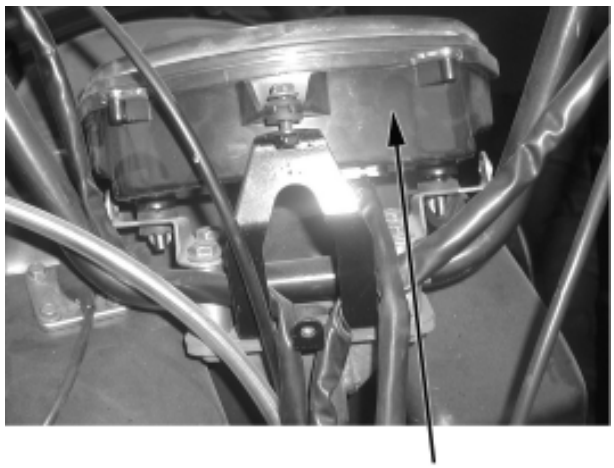
Bulb specification:12V-35/35W

Reverse the removal procedure for installation
After replacing the bulb, adjust headlight beam
（→ 3－14）

Inspection of Headlight

Turn the ignition switch to ON position, turn light switch to the illuminating position and check if the headlight is on.
-ON: Normal
-Still off: short circuit of main cable or broken main cable

NOTE:
Main cable,wiring and tube should be routed properly(→ chapter 1)



Dashboard Light Bulb

Remove dashboard（→ 13-9）
Remove dashboard indicator socket.
Dashboard indicator:LCD

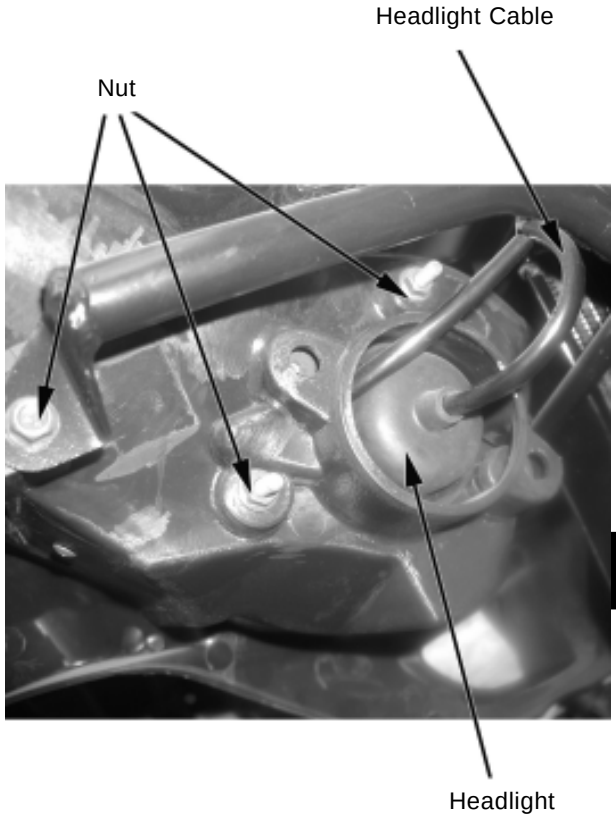
Note: If dashboard has something wrong, it's recommended to replace whole dashboard.

Reverse the removal procedure for installation

Headlight

Remove nuts as picture shown
Disconnect headlight connector
Disassemble headlight comp.

Reverse the removal procedure for installation.



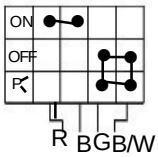
NOTE:
Be careful not to damage main cable when assembling.

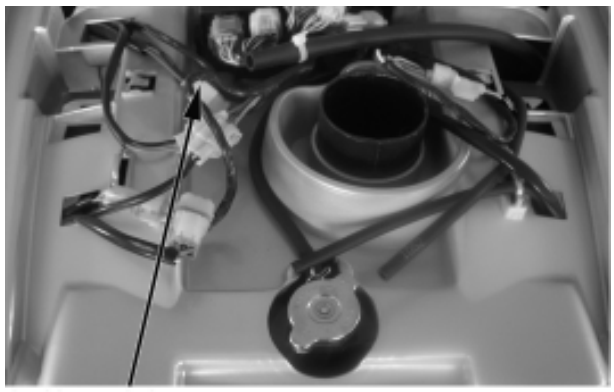
After replacing, adjust the headlight beam.
（→ 3-14）

NOTE:
Main cables and wires should be routed properly.

Check according to the following table if the connector terminals are in continuity.

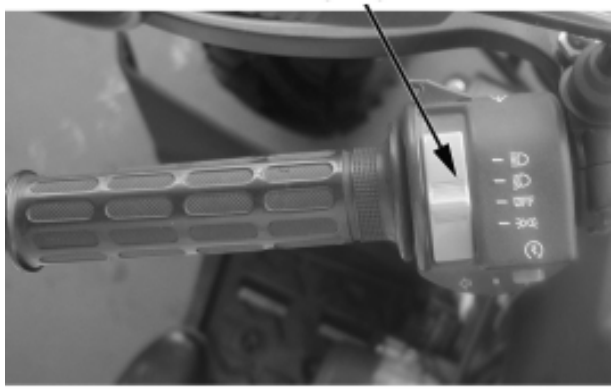
●－● Continuity





Ignition Switch Connector

Lighting Switch



Disassemble:
Remove front cover (→2-4).
Disconnect 4P connector of ignition switch.

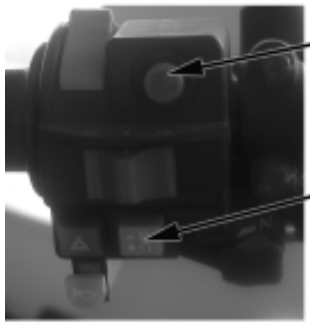
Loosen bolt and remove ignition switch.

Reverse the removal procedure for installation.

Handlebar switch

Remove front cover(→2-4).
Disconnect left and right handlebar switch connector.
Check according to the following table if the connector terminals are in continuity.

○⇧－● Continuity



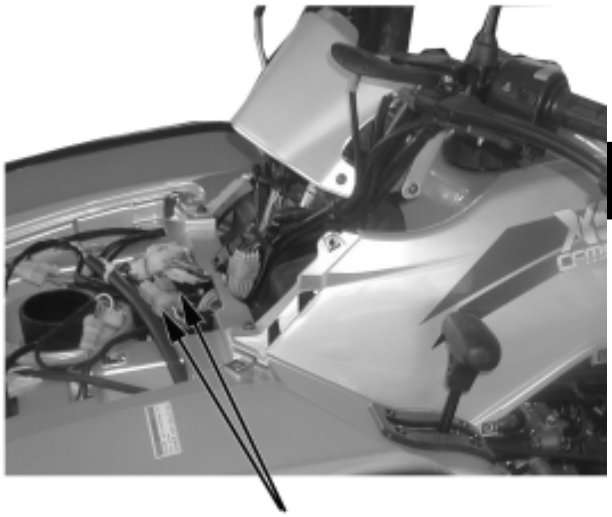
Starter Switch

Kill Switch

	BLK/BRN	BRN	BRN/WHT	BLU	WHT/BLU	WHT
	●	●	●	●	●	
	●	●	●		●	●
OFF						
	●	●	●			

	BLK/WHT	GRN	BLK/BRN	BLK/YEL
	●	●		
			●	●

	YEL	GRY/RED
	●	●

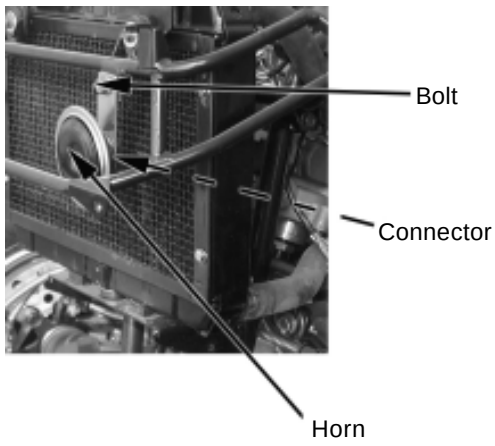


Handlebar Switch Connector

Disassemble

Disconnect horn connector.
Remove bolt.
Remove horn.

Reverse the removal procedure for installation.



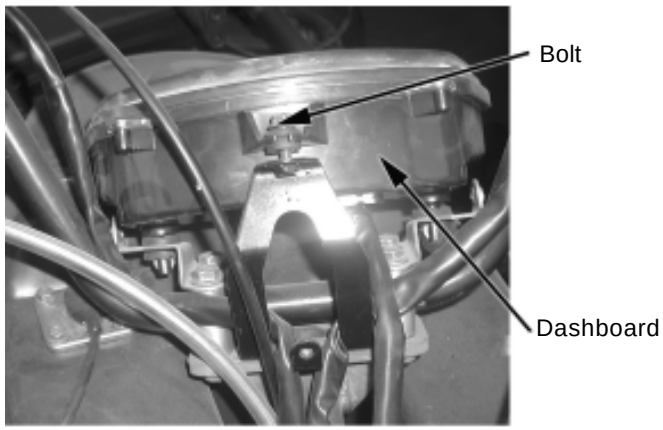
Dashboard

Run the vehicle at low speed and check if the speed indicator moves.
Faulty speedometer: Replace.

Removal and Installation

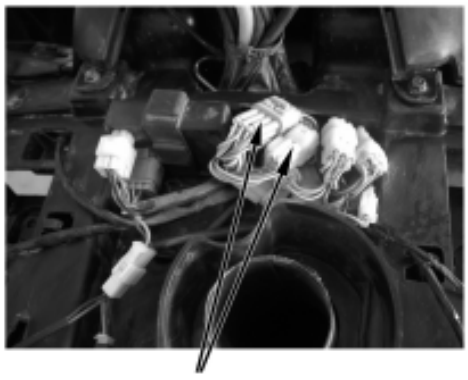
Remove front top cover（→2-4）.
Remove front cover of dashboard（→2-4）.

Disconnect dashboard wire connector.



Remove fixing nut and remove dashboard in the direction as illustrated on the right.

Reverse the removal procedure for installation.



Note:
Main cables and wires shall be routed properly.

Installation

Put fuel sensor into installation hole of fuel tank.

Fuel sensor should be fitted properly.
Check for fuel leakage after installation.

Connect 2P connector

Fuel Sensor Connector

Inspection of Fuel Gauge

Switch on power supply and check if fuel level gauge functions normally.

If fuel gauge works normally,
Reverse the removal procedure for installation of plastic parts and seat.

1.Engine troubleshooting

Complaint	Symptom and Possible Causes	Remedy
Engine will not start or is hard to start	**Compression is Too Low**	
	1.Worn cylinder	Replace
	2.Worn piston ring	Replace
	3.Leakage with cylinder gasket	Replace
	4.Wear valve guide or improper valve seating	Repair or Replace
	5.Loose spark plug	Tighten
	6.Slow cranking of starting motor	Check electrical part
	7.Faulty valve timing	Adjust
	8.Improper valve clearance	Adjust
	No Spark from Spark Plug	
	1. Fouled spark plug	Clean or Replace
	2. Wet spark plug	Clean and dry or replace
	3. Defective ignition coil	Replace
	4. Open or short circuit with pickup coil	Replace
	5. Faulty generator	Replace
Engine stalls easily or has unstable idle speed	1. Improper valve clearance	Adjust
	2. Improper valve seating	Replace or Correct
	3. Faulty valve guide	Replace
	4. Worn rocker arm or rocker arm shaft	Replace
	5. Fouled spark plug	Replace
	6. Improper spark plug gap	Replace or Adjust
	7. Faulty ignition coil	Replace
	8. Clogged idle-vale inlet & exhaust pipe	Adjust Fuel level
	9. Faulty magneto	Replace

Complaint	Symptom and Possible Causes	Remedy
Poor engine running in high-speed range.	1. Weak valve spring **2. Worn camshaft** 3. Fouled spark plug 4. Insufficient spark plug gap 5. Improper valve timing 6. Faulty ignition coil 7. Weak high pressure fuel pump, resulting in poor fuel supply 8. Dirty air filter	Replace Replace Clean or replace Adjust or replace Replace Adjust Adjust or replace Clean or replace
Exhaust smoke is dirty or thick	1. Excessive engine oil 2. Worn piston ring 3. Worn valve guide 4. Scored or scuffed cylinder wall 5. Worn valve stem 6. Worn valve stem oil seal	Check oil level and drain Replace Replace Replace Replace Replace
Engine lacks power	1. Improper valve clearance 2. Weak valve spring 3. Improper valve timing 4. Worn cylinder 5. Worn piston ring 6. Improper valve seating 7. Fouled spark plug 8. Improper spark plug gap 9. Clogged fuel injector 10. Dirty air filter 11. Worn rocker arm or rocker arm shaft 12. Air leakage from air intake pipe 13. Excessive engine oil	Adjust Adjust Adjust Replace Replace Replace or Correct Clean or replace Clean or replace Clean or replace Adjust fuel level Clean or replace Replace Tighten or replace Check oil level and drain
Engine overheats	1. Carbon deposit on piston top 2. Insufficient or excessive engine oil 3. Faulty oil pump 4. Clogged oil passage 5. Air leakage from air intake pipe 6. Incorrect engine oil 7. Faulty cooling system(7-5)	Clean Check level, add or drain Replace Clean Tighten or replace Change engine oil

Complaint	Symptom and Possible Causes	Remedy
Engine is noisy	**Valve Chatter**	
	1. Excessive valve clearance	Adjust
	2. Worn or broken valve spring	Replace
	3. Worn rocker arm or camshaft	Replace
	Noise from Piston	
	1. Worn piston	Replace
	2. Worn cylinder	Replace
	3. Carbon deposit in combustion chamber	Clean
	4. Worn piston pin or pin hole	Replace
	5. Worn piston ring or piston ring groove	Replace
	Noise from Timing chain	
	1. Stretched chain	Replace chain & sprocket
	2. Worn sprocket wheel	Replace chain & sprocket
	3. Faulty chain tensioner	Repair or replace
	Noise from Clutch	
	1. Worn or damaged crankshaft spline	Replace crankshaft
	2. Worn inner race spline	Replace inner race
	Noise from Crankshaft	
	1. Rattling bearing	Replace
	2. Worn or burnt crank pin bearing	Replace
	3. Excessive thrust clearance	Replace
	Noise from CVT	
	1. Worn or slipping drive belt	Replace
	2. Worn rollers in primary sheave	Replace
	Noise from Transmission	
	1. Worn or damaged gear	Replace
	2. Worn or damaged input or output shafts	Replace
	3. Worn bearing	Replace
	4. Worn bushing	Replace
Slipping Clutch	1. Worn or damaged clutch shoes	Replace
	2. Weakened clutch shoe spring	Replace
	3. Worn clutch housing	Replace
	4. Worn or slipping drive belt	Replace

2 Diagnosis troubles according to EFI system Trouble Code

NOTE:

1. Only start inspection and fixation when trouble is steady-state; otherwise diagnosis would probably be wrong.
2. The “multimeter” mentioned below are numerical mutimeter; it is forbidden to use pointer type multimeter to make EFI system inspecting.
3. When Trouble Code tells “Low Voltage”, means probably it’s Short Circuit to Ground or Broken Circuit; When Trouble Code tells “High Voltage”, means probably it’s Short Circuit to Power; When Trouble Code tells “Circuit Error”, means Circuit Broken or Various Errors Exist.

Diagnosis Help:

1. Trouble Code cannot be cleared, means trouble is steady-state; Focusing on the connector wires’ possible looseness if trouble is incidental.
2. When making inspections ,do not ignore possible affect from vehicle maintenance condition, cylinder pressure, mechanism timing.
3. If Trouble Code is cleared, it means defective on ECU; If Trouble Code is not cleared, put back original ECU and repeat inspecting procedure to start again overhaul inspections.

Following are implications of EFI System Trouble Code,Diagnosis Measurements, Possible Reasons and their Solutions as references.

Trouble Code: P0030 Oxygen Sensor Heating Control Circuit Broken

Note	Note
Possible Troubles are as below 1）Circuit broken between ECU Pin and Oxygen Sensor Pin 2. 2）Circuit broken between Oxygen Sensor Pin 1 and Main Relay. 3）Circuit broken between Oxygen Sensor Pin 1 and Pin 2.	Inspect as below 1）Check if resistance between ECU Connector Pin and Oxygen Sensor Pin 2 is normal or not. 2）Check if resistance between Oxygen Sensor Pin 1 and Main Relay is normal or not. 3）Check if resistance between Oxygen Sensor Pin 1 and Pin 2 is normal or not.

Trouble Code: P0031 Oxygen Sensor Heating Circuit Short to Ground.

Note	Note
Possible Troubles are as below 1）Circuit connect to ECU Pin are short-to-ground.	Inspect as below 1）Check if resistance of ECU Pin to ground is normal or not.

Trouble Code: P0032 Oxygen Sensor Heating Circuit Short to Power

Note	Note
Possible Troubles are as below 1）Short Circuit between ECU Pin and Oxygen Sensor Pin 1. 2）Short Circuit between ECU Pin and other circuit.	Inspect as below 1）Check if resistance of ECU is normal or not. 2）Check if resistance between ECU Pin and Oxygen Sensor Pin 1 circuit is normal or not.

Trouble Code：P0053 Inner Resistance of Oxygen Sensor Heating not correct

Explanation: ECU system measure the Oxygen Sensor Heating Resistance to decide if heating output is correct or not. In some conditions, Heated Oxygen Sensor would be damaged by precipitate, especially while making cold start.

Note	Note
Possible Troubles are as below 1）Oxygen Sensor Heatng function disable; Replace Oxygen Sensor.	Possible Troubles are as below 1) Check if resistance between Oxygen Sensor Pin 1 and Pin 2 is normal or not.

Trouble Code： Air Inlet Pressure Sensor no signal variable

Note	Note
Possible Troubles are as below 1）Air Inlet Pressure Sensor frozen or jammed. 2) Air Inlet Pressure Sensor seriously aging.	Possible Troubles are as below 1）Re-install the Air Inlet Pressure Sensor after ice melted with indoor temperature.

Trouble Code：P0106 Air Inlet Pressure Sensor Signal irrationally failure

Note Possible Troubles are as below 1）Air leakage of Air Inlet Pressure Sensor. 2）Air Inlet Pressure Sensor broken. 3）Air leakage from assemble point. 4）Air Inlet Pressure Sensor characteristically defluxion.	

Trouble Code：P0107 Low Voltage of Air Inlet Pressure Sensor Circuit

Note Possible Troubles are as below 1）ECU found Air Inlet Pressure Sensor signal circuit short to ground.	Note Inspect as below 1）Resistance between ECU Pin and Ground.

Trouble Code：P0108 High Voltage of Air Inlet Pressure Sensor Circuit

Note Possible Troubles are as below 1）ECU found Air Inlet Pressure Sensor signal circuit short to power.	Note Inspect as below 1）Resistance of ECU Pin.

Trouble Code：P0112 Air Inlet Temperature Sensor Signal Voltage Low.

Note Possible Troubles are as below 1）Circuit between ECU Pin and Air Inlet Temperature Sensor Signal short to ground.	Note Inspect as below 1）Check Resistance of circuit between ECU Pin Sensor Signal and Ground.

Trouble Code：P0113 Air Inlet Temperature Sensor Signal Voltage High.

Note Possible Troubles are as below 1）Circuit between ECU Pin and Air Inlet Temperature Sensor Signal short to power.	Note Inspect as below 1）Check if voltage of Sensor Signal of ECU Pin is normal or not.

Trouble Code： Engine Water Temperature Sensor Indicated Temperature irrationally failure

Note Possible Troubles are as below 1）Water Temperature Sensor need replacement	

Trouble Code：P0117 Engine Water Temperature Sensor Circuit Voltage low.

Note Possible Troubles are as below 1）Circuit between ECU Pin and ground short.	Note Inspect as below 1) Check resistance between ECU Pin and Ground.

Trouble Code：P0118 Engine Water Temperature Sensor Circuit Voltage high.

Note Possible Troubles are as below 1）Short Circuit between ECU circuit and other circuit.	Note Inspect as below 1) Check if voltage connected to ECU pin is normal or not.

Trouble Code：P0122 Voltage of Throttle Control Positioning Sensor Circuit lower than the lower limit

Note Possible Troubles are as below 1） ECU Pin short to ground.	Note Inspect as below 1) Check resistance between ECU pin and ground.

Trouble Code：P0123 Voltage of Throttle Control Positioning Sensor Circuit higher than the higher limit

Note Possible Troubles are as below 1）Circuit between ECU Pin and other power circuit short.	Note Inspect as below 1) Check if ECU Pin voltage is normal or not.

Trouble Code：P0130 Oxygen Sensor Signal irrationally failure

Explanation: When Oxygen Sensor Signal happens with situations as below, System decide Oxygen Sensor Signal irrationally failure

Oxygen Sensor Signal Circuit coupling with Heating Circuit.

Note Possible Troubles are as below 1）Check if Oxygen Sensor Connector is correct or not. 2）Check if Oxygen Sensor Signal Circuit coupling with Heating Circuit.	

Trouble Code：P0131 Oxygen Sensor Circuit Voltage Low

Note Possible Troubles are as below 1) Signal Circuit connected with ECU Pin is short circuit to ground.	Note Inspect as below 1）Check resistance between Signal Circuit connected with ECU Pin and ground.

Trouble Code：P0132 Oxygen Sensor Circuit Voltage High

Explanation： When engine starts, ECU check the Oxygen Sensor Circuit Voltage; When voltage is continuously higher than 1.5 Volt, system decides Oxygen Sensor Circuit Voltage is short to power.

Note	Note
Possible Troubles are as below 1）Short Circuit between Signal Circuit connect to ECU Pin and Oxygen Sensor Oxygen Sensor Pin 1. 2）Short Circuit between Signal Circuit connect to ECU Pin and other power circuit.	Inspect as below 1）Check resistance between Signal Circuit connect to ECU Pin and Oxygen Sensor Oxygen Sensor Pin 1 2）Check resistance of Signal Circuit connect to ECU Pin

Trouble Code：P0133 Oxygen Sensor Aging

Explanation: Normally Air Fuel Ratio of Fuel and Air is shifting between Dense and Dilute; accordingly Oxygen Sensor signal variate among different values. When Oxygen Sensor is aging, it goes less sensitive to Fuel-Air-Mixture, which makes signals variate lower. ECU makes average cycle calculations to Signal Variation; when it finds cycling slower as set, it decides Oxygen Sensor Aging.

Note	
Possible Troubles are as below 1）Oxygen Sensor Aging, need replacement.	

Trouble Code：P0134 Oxygen Sensor Signal Failure

Explanation：When engine starts, ECU check the Oxygen Sensor Circuit Voltage; When ECU finds voltage stays between 0.4-0.6 volt, it decides Oxygen Sensor Signal Circuit Short.

Note	Note
Possible Troubles are as below 1）Short Circuit between Oxygen Sensor connected to ECU Pin. 2）Bad connection of Oxygen Sensor Connectors.(Socket Oxidized)	Inspect as below 1）Check resistance between ECU connector and Oxygen Sensor 4.

Trouble Code：P0170 Self Studying found Closing Loop control Air Fuel Ratio irrational when making End of Line Testing.

Trouble Code：P0171 Self Studying found Closing Loop control Air Fuel Ratio too dulate when making End of Line Testing.

Trouble Code：P0172 Self Studying found Closing Loop control Air Fuel Ratio too dense when making End of Line Testing.

（Note: This Inspection Process is only suitable when Air Inlet Pressure Sensor, Canister Control Valve and Oxygen Sensor and so on has not shown with Trouble Code; If there is any other Trouble Code, solve other Troubles first and then inspect Fuel Route correct or not)

Trouble Code：P0201 Cylinder Injector Control Circuit Open

Note	Note
Possible Troubles are as below 1） Injector Coil Open Circuit 2） Injector Connector Socket to ECU Pin bad connection 3） Injector Connector Socket to Main Relay bad connection	Inspect as below 1） Check resistance of Injector 2)Check cable is connected or not

Errors coding: P0261 Control circuit of single cylinder injector short to ground

Maintenance Tips： The possible faults may exists as follow: 1）All drivers ECU pin connected short to ground	Maintenance Tips： Check the item as follow: 1）Measure ECU pin connected resistance to ground

Errors coding: P0262 Control circuit of single cylinder injector short circuit

Maintenance Tips： The possible faults may exists as follow: 1）Short circuit between circuit ECU connected and other electrical source circuits	Maintenance Tips： Check the item as follow: 1）Measure the voltage of circuit ECU pin connected

Errors coding: P0321 reference point of rotate speed sensor fault

Maintenance Tips： The possible faults may exists as follow: 1）Circuits connect intermittently short circuit or intermittently open circuit. 2）Fixed position of crankshaft signal ring deviation declination. 3）Fixed position of rotate speed sensor declination.	Maintenance Tips： Check the items as follow: 1）Check the connection or breaking of cable related connection. 2）Check the quantity of magneto flywheel.

Errors coding: P0322 Non-rotate speed sensor pulse signal (short circuit or open circuit)

Explanation: After starting engine, ECU will measure signal of trigger and other signals together, judging the losing of trigger signal by signal rationality system.

Maintenance Tips： The possible faults may exists as follow: 1）Trigger rotate speed sensor ECU cable connected open circuit 2）Trigger circuit ECU connected short circuit. 3）Trigger coil open circuit.	Maintenance Tips： 1）Measure resistance between trigger and ECU cable connected 2）Measure resistance of trigger 3）Measure trigger peak value voltage

Errors coding: P0444 Control circuit voltage of idle air control valve open circuit

Maintenance Tips： The possible faults may exists as follow: 1）Open circuit between ECU circuit connected and no.2 pin of idle air control valve. 2）The circuit that no.1 pin of idle air control valve connected to main relay open way. 3）Electromagnetism coil between no.1 pin and no.2 pin open way.	Maintenance Tips： 1）Check the connection or breaking of cable related connection. 2）Measure resistance of idle speed valve.

Errors coding: P0458 Control circuit voltage of idle air control valve too low

Maintenance Tips: The possible faults may exists as follow: 1）Circuit ECU connected is short circuit	Maintenance Tips：Check the item as follow: 1）Measure connected to the ECU pin-to-ground resistance whether proper or not

Errors coding: P0459 Control circuit voltage of idle air control valve too high

Maintenance Tips: The possible faults may exists as follow: 1）Short circuit between ECU circuit connected and No.1 pin of idle air control valve. 2）Short circuit between circuit ECU pin connected and other electrical source circuits	Maintenance Tips: Check the item as follow: 1）Measure the voltage of ECU pin whether normal or not 2）Measure resistance between ECU pin and No.1 pin of idle air control valve

Errors coding: P0501Speed sensor signal improper.

Explanation: When loose throttle and keep direct to free-wheel, ECU measure engine rotate speed and vehicle speed together. If engine lasting higher speed but vehicle speed display “0” or too low obviously, system will judge that vehicle speed signal faults.

Maintenance Tips: The possible faults may exists as follow: 1）The signal circuit ECU connected and vehicle speed sensor short to ground or open to ground.	Maintenance Tips: Check the item as follow: 1) Check circuit resistance that connecter of ECU joint to vehicle speed signal sensor. 2）Check resistance to ground of ECU pin.

Errors coding: P0506 Rotate speed of idle air control valve slower than target idle speed

Explanation: Engine rotate speed of idle speed control valve works by closed-loop control. And it indicates fault if ECU performs idle speed controlling after a certain time, but the actual engine speed still slower than target idle speed.

Maintenance Tips: The possible faults may exists as follow: 1） Idle air control valve not work. 2） Check adjust bolt of throttle valve、throttle cable、throttle operating condition etc. whether are in condition or not. 3）Too dirty inside of throttle valve body	

Errors coding: P0507

Rotate speed of idle speed control valve faster than target idle speed

Introduction of theory and fault reason: Engine rotate speed of idle speed works by closed-loop control. And it indicates fault if ECU performs idle speed controlling after a certain time, but the actual engine speed faster than target idle speed.

Maintenance Tips: The possible faults may exists as follow: 1)Check adjust bolt of throttle valve、throttle cable、throttle operating condition etc. whether are in condition or not. 2) Too dirty inside of throttle valve body 3) Check crankcase enforced-air flue whether breaks off or leaks	

Errors coding: P0560 Voltage signal of system battery illogicality

Errors coding: P0562 Voltage signal of system battery is too low

Errors coding: P0563 Voltage signal of system battery is too high

Maintenance Tips: The possible faults may exists as follow: 1) Magneto damaged and disable to starting or battery electric leakage 2) Magneto stator coil open circuit 3) Regulator of Magneto damaged	Maintenance Tips: Check the item as follow: 1) Check the capability of generate electricity of Magneto(measure voltage of Magneto after starting)

Errors coding: P0627 Control circuit of oil pump relay open circuit

Errors coding: P0628 Control circuit of oil pump relay short to ground

Errors coding: P0629 Control circuit of oil pump relay short circuit

Maintenance Tips: The possible faults may exists as follow: 1) Open circuit/short to ground/short circuit between control circuit of oil pump relay connected to ECU and oil pump. 2) Open circuit between relay and main relay 3) Magnet coil of relay open circuit	Maintenance Tips: Check the items as follow: 1) Measure resistance or voltage of oil pump relay control circuit connected to ECU. 2) resistance between relay and main relay 3) resistance between the toes of relay

Errors coding: P0650 MIL lamp-driver circuit fault

Maintenance Tips: The possible faults may exists as follow: 1) Open circuit/short to ground/short circuit on circuit of MIL lamp-driver connected to ECU. 2) Open circuit between MIL and main relay. 3) MIL lamp burnout	Maintenance Tips: Check the item as follow: 1) Measure resistance or voltage of MIL lamp-driver control circuit connected to ECU.

Errors coding: P2177

Self-learning value of air-fuel ratio, closed-loop control exceeds upper limit

Errors coding: P2178

Self-learning value of air-fuel ratio, closed-loop control exceeds lower limit

Introduction of theory and fault reason: In order to make catalytic converters for HC, CO and NOx to maximize conversion efficiency, the air-fuel ratio of mixture should be 14.7:1. When the engine occurs, parts manufacturing deviation, deposition of fuel colloid on fuel injector, intake or back of valve, gas leak of intake and exhaust system, will cause the air-fuel ratio(14.7:1) deviation in various degrees(partial dilute or partial concentration) which will lead to emission deterioration and poor engine performance. Engine control system will amend and self-learning fuel charge based on the extent and characteristics of air-fuel ratio deviation. When self-learning value reach the limit of system setting (gas mixture partial dilute or partial concentration, system amends the fuel charge constantly till Max), system will judge that self-learning value transfinite fault.

Maintenance Tips：

The possible faults may exists as follow:

1）Injector clog needs cleaning

2）Intake and exhaust system leaks

3）Inlet or back of intake valve has carbon build-up, needs to be decarbonized.

4）Engine parts deviation

5）Valve clearance deviation

6）Fuel system pressure deviation

3.Diagnosis troubles according to engine fault phenomena

Before start to diagnosis fault, please take the primary inspection first:

1.Engine failure indicator light works regularly.

2.Affirm that no errors Code have been found by Diagnosis Analyze.

3.Affirm the fault that user complaint is exist, and affirm the condition of fault happened.

Then, take external inspection:

（1） Check fuel pipe for has fuel leaks.

（2） Check vacuum tube if rupture, kink or incorrect connection.

（3） Check air intake pipe whether clogged, leaked, been staved or damaged or not.

（4） Check ignition coil of ignition system whether rupture, aged or not, firing sequence whether correct or not；

（5） Check ground of wiring harness make sure it's clean and tight.

（6） Check connections for loose or poor contacts or not.

Notice：Please maintain the faults as above in advance. If not, the further fault diagnosis will be affected.

Diagnosis help:

1.Engine has no fault records；

2.Affirm the complaint of fault happened；

3.Do not ignore vehicle maintenance working, cylinder pressure, mechanism timing, fuel etc effect against system during overhaul

4.Replace ECU and test it.

If Trouble Code is cleared, it means defective on ECU;

If Trouble Code is not cleared, put back original ECU and repeat inspecting procedure to start again overhaul inspections.

Troubleshooting：

- Starting Failure/Hard Starting.
- Engine can rotate but will not start.
- Hard Starting when hot.
- Hard Starting when cold.
- Hard Starting all the time.
- Engine works regularly，but unsteady idle speed all the time.
- Engine works regularly，but unsteady idle speed when engine is in warming-up.
- Engine starting normally, but idle speed unsteady after warming-up.
- Engine starting normally, but unsteady idle speed or power off when idles.
- Engine starting regularly, but idle speed is too high.
- Rotate speed can not increase or engine power off when in acceleration.
- Reaction slowly when in acceleration.
- No power and poor performance when in acceleration

（1）Starting Failure/Hard Starting

Possible defective part：1.Battery；2.Starter motor；3.Wiring harness or ignition switch;4.engine mechanism part.

Overhaul:

Ref No.	Operation	Test result	Next Steps
1	Check the voltage between the two poles of battery by multimeter, the voltage whether around 8-12V or not when engine starting.	yes	next
		no	Replace battery
2	Keep ignition switch in engine starting station. Check positive pole of Starter motor by multimeter, the voltage whether above 8V or not.	yes	next
		no	Repair or replace wiring harness
3	Remove starter motor and check its working condition, if circuit break or starter motor locked because of improper lubricate.	yes	Repair or replace Starter Motor
		no	next
4	Fault only happens on winter, please check lubricating oil if is improper for engine which caused high resistance of starter motor.	yes	Replace appropriate grade of lubricating oil
		no	next
5	Check the resistance inside of engine mechanism whether is high or not, which makes starter motor stop rotates or rotate slowly.	yes	Overhaul the resistance inside of engine mechanism
		no	Repeat above steps

（2）Engine can rotate but starting failure

Possible defective part：1、no gasoline in tank；2、Fuel pump；3、Trigger；4、Ignition coil；5、engine mechanism part.

Overhaul:

Ref No.	Operation	Test result	Next Steps
1	Contact fuel pressure meter(contact front point of oil input pipe of injector)，open ignition switch and repeat it if possible, or starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
2	Contact Electronic injection diagnostic meter, observe item of “engine rotate speed”, starting engine, and observe the rotate speed signal if is normally output.	Yes	next
		no	examine and repair sensor wiring of rotate speed
3	Pull out ignition coil, and contact with spark plug, keep pole of spark plug 5mm with body of engine, starting engine and check it whether has blue-white high spark.	yes	next
		no	Examine and repair ignition system.

4	Check compression of cylinder and observe the pressure if is discrepantly.	yes	Eliminate engine mechanism fault
		no	next
5	Contact EFI commutator, open ignition switch, check ECU5#、10#、13# stitch, the power whether supply normally or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

（3）**Hard Starting in normal status**

Possible defective part：1、fuel containing water；2、fuel pump；3、engine water temperature sensor；4、ignition coil

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
2	Pull out ignition coil, and contact with spark plug, keep pole of spark plug 5mm with body of engine, starting engine and check it whether has blue-white high pressure fire or not.	yes	next
		no	Examine and repair ignition system.
3	Pull out connector of engine water temperature sensor, starting engine, observe engine whether succeed starting or not at this moment. (or in series a 300Ωresistant instead of engine water temperature sensor, observe engine whether succeed starting or not at this moment.)	Yes	Examine and repair wiring or replace sensor
		No	Next
		No	Next
4	Check fuel and observe the fault if caused after fueling	yes	Replace fuel
		no	next
5	Contact EFI commutator, open ignition switch, check ECU5#、10#、13# stitch the power whether supply normally or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

（4）**Hard Starting in cold status**

Possible defective part：1、fuel containing water；2、fuel pump；3、engine water temperature sensor；4、injector；5、ignition coil；6、throttle valve body and idle speed side air duct; 7、engine mechanism part 。

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
2	Pull out ignition coil, and contact with spark plug, keep pole of spark plug 5mm away of body of engine, starting engine and check it whether has blue-white spark fire or not.	yes	next
		no	Examine and repair ignition system.
3	Pull out connector of engine water temperature sensor, starting engine, observe engine whether succeed starting or not at this moment. (or in series a 2500Ω resistant instead of engine water temperature sensor, observe engine whether succeed starting or not at this moment.)	Yes	Examine and repair wiring or replace sensor
		no	next
4	Draw accelerograph gently, observe it whether starting engine easily or not.	yes	Clean throttle valve body and idle speed air duct
		no	next
5	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks or clogs	yes	Replace
		no	next
6	Check fuel and observe the fault if caused after fueling	yes	Replace fuel
		no	next
7	Check compression of cylinder and observe the pressure if it is discrepantly.	yes	Eliminate engine mechanism fault
		no	next
8	Contact EFI commutator, open ignition switch, check ECU5#、10#、13# stitch, the power whether supply normally or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

（5）Regularly rotate speed, but engine starting hard at any time

Possible defective part：1、fuel containing water；2、fuel pump；3、engine water temperature sensor；4、injector；5、ignition coil；6、throttle valve body and idle speed side air duct; 7、input air duct；8、ignition timing；9、spark plug；10、engine mechanism part

Overhaul:.

Ref no	Operation	Test result	Next Steps
1	Check air cleaner and input air duct whether are clogged or not	yes	Examine and repair air input system
		no	next

2	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
3	Pull out ignition coil, and contact with spark plug, keep pole of spark plug 5mm away with body of engine, starting engine and check it whether has blue-white high pressure fire or not.	yes	next
		no	examine and repair ignition system
4	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
5	Pull out connector of engine water temperature sensor, starting engine, observe engine whether succeed starting or not at this moment.	yes	Examine and repair wiring or replace sensor
		no	next
6	Draw accelerograph gently, observe it whether starting engine easily or not.	yes	Clean throttle valve body and idle speed air duct
		no	next
7	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks or clogs	yes	replace
		no	next
8	Check fuel and observe the fault if caused after fueling	yes	Replace fuel
		no	next
9	Check compression of cylinder and observe the pressure if is discrepantly.	yes	Eliminate engine mechanism fault
		no	next
10	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing
11	Contact EFI commutator, open ignition switch, check ECU5#、10#、13# stitch the power whether supply normal or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

（6）Engine works regularly，but unsteady idle speed at any time

Possible defective part：1、fuel containing water；2、injector；3、spark plug；4、throttle valve body and idle speed side air duct；5、input air duct；6、idle speed valve；7、ignition timing；8、engine mechanism part

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Check air cleaner and input air duct whether are clogged or not	yes	Examine and repair air input system
		no	next

2	Check idle speed valve whether clogged or not.	Yes	Clean or replace
		no	next
3	Check spark plug, look its type and gap if accords with standard.	Yes	next
		no	Adjust or replace
4	Check throttle valve body and idle speed side air duct whether have carbide accumulated or not.	Yes	Clean
		no	next
5	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	Yes	Fault replacement
		no	next
6	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
7	Check compression of cylinder and observe the pressure if is discrepantly.	yes	Eliminate engine mechanism fault
		no	next
8	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing
9	Contact EFI commutator, open ignition switch, check ECU5#、10#、13# stitch, the power whether supply normal or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

（7）**Engine works regularly，but unsteady idle speed when engine is in warming-up**

Possible defective part：1、fuel containing water 2、engine water temperature sensor；3、spark plug；4、throttle valve body and idle speed side air duct; 5、input air duct；6、idle speed valve；7、engine mechanism part

Overhaul:：

Ref no	Operation	Test result	Next Steps
1	Check air cleaner and input air duct whether are clogged or not	yes	Examine and repair air input system
		no	next
2	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
3	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
4	Pull out connector of engine water temperature sensor, starting engine, observe idle speed whether is unsteady or not when engine is in warming-up.	yes	Examine and repair wiring or replace sensor
		no	next
5	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	yes	Fault replacement
		no	next

6	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
7	Check compression of cylinder and observe the pressure.	yes	Eliminate engine mechanism fault
		no	next
8	Contact EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

（8）Engine starting normally, but idle speed unsteady after warming-up.

Possible defective part：1、fuel containing water 2、engine water temperature sensor；3、spark plug；4、throttle valve body and idle speed side air duct; 5、input air duct；6、idle speed valve；7、engine mechanism part

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Check air cleaner and input air duct whether are clogged or not	yes	Examine and repair air input system
		no	next
2	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
3	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
4	Pull out connector of engine water temperature sensor, starting engine, observe idle speed whether is unsteady or not when engine is in warming-up.	yes	Examine and repair wiring or replace sensor
		no	next
5	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	yes	Fault replacement
		no	next
6	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
7	Check compression of cylinder and observe the pressure if it is discrepantly.	yes	Eliminate engine mechanism fault
		no	next
8	Contact EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether Put up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

（9）Engine starting normally, but unsteady idle speed or power off when engine in partly loading(such as: opening head light)

Possible defective part：1、idle speed valve；2、injector

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
2	Observe output power whether is increasing or not when begin loading work, namely observe the movement of ignition advance angle、injection pulse width and air intake flowrate by EFI diagnosis instrument	yes	Turn step no.4
		no	next
		no	Examine and repair air condition system
3	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	yes	Fault replacement
		no	next
4	Contact EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether is puting up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

（10）Engine starting regularly, but idle speed is too high.

Possible defective part：1、throttle valve body and idle speed side air duct； 2、injector seat；3、idle speed valve；4、engine water temperature sensor；5、ignition timing.

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Check the throttle cable if is clipped or too tight.	yes	adjust
		no	next
2	Check air intake system and connector of injector seat, the air if is leaking.	yes	Examine and repair air intake system
		no	next
3	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
4	Pull out connector of engine water temperature sensor, starting engine, observe idle speed whether is unsteady or not when engine is in warming-up.	yes	Examine and repair wiring or replace sensor
		no	next
5	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing

6	Contact with EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether is puting up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

（11）Rotate speed can not increase or engine power off when in acceleration.

Possible defective part：1、fuel containing water；2、air intake pressure sensor and throttle position sensor；3、spark plug；4、throttle valve body and idle speed side air duct；5、input air duct；6、idle speed valve；7、fuel injector；8、ignition timing；9、muffler

Overhaul:

Ref no	Operation	Test result	Next Steps
1	Check air cleaner if is clogged.	yes	Examine and repair air input system
		no	next
2	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
3	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
4	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
5	Check air intake pressure sensor、throttle position sensor and their wiring whether works regularly or not.	yes	next
		no	examine and repair wiring or replace sensor
6	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	yes	Fault replacement
		no	next
7	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
8	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing
9	Check the exhaust gas from muffler if exhausts smoothly	yes	next
		no	Repair or replace muffler
10	Contact with EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether is puting up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

（12）Reaction slowly when in acceleration.

Possible defective part：1、fuel containing water；2、air intake pressure sensor and throttle position sensor；3、spark plug；4、throttle valve body and idle speed side air duct；5、input air duct；6、idle speed valve；7、fuel injector；8、ignition timing；9、muffler

Overhaul：

Ref no	Operation	Test result	Next Steps
1	Check air cleaner if is clogged.	yes	Examine and repair air input system
		no	next
2	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
3	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
4	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
5	Check air intake pressure sensor、 throttle position sensor and their wiring whether works regularly or not.	yes	next
		no	examine and repair wiring or replace sensor
6	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks, clogs or flux discrepantly.	yes	Fault replacement
		no	next
7	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
8	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing
9	Check the exhaust gas from muffler if exhausts smoothly	yes	next
		no	Repair or replace muffler
10	Contact with EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether is puting up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring

（13）No power and poor performance when in acceleration.

Possible defective part：1、fuel containing water；2、air intake pressure sensor and throttle position sensor；3、spark plug；4、ignition coil;5、throttle valve body and idle speed side air duct；6、input air duct；7、idle speed valve；8、fuel injector；9、ignition timing；10、muffler

Overhaul：

Ref no	Operation	Test result	Next Steps
1	Check the faults if exist clutch skid, low tyre pressure, lagged brake, improper tyre size etc.	yes	repair
		no	next
2	Check air cleaner if is clogged.	yes	Examine and repair air input system
		no	next
3	Contact fuel pressure meter(contact front point of oil input pipe of injector), starting engine, check the fuel pressure whether is around 300kPa or not	yes	next
		no	examine and repair oil support system
4	Pull out ignition coil, and contact with spark plug, keep pole of spark plug 5mm away with body of engine, starting engine and check the high pressure fire whether is normal or not.	yes	next
		no	examine and repair ignition system
5	Check spark plug, look its type and gap if accords with standard.	yes	next
		no	Adjust or replace
6	Disassembly idle speed valve and check the throttle valve body, idle speed valve and idle speed side air duct whether have carbide accumulated or not.	yes	Clean related parts
		no	next
7	Check air intake pressure sensor, throttle position sensor and their wiring if works regularly.	yes	next
		no	examine and repair wiring or replace sensor
8	Disassembly injector, and check the injector by special washing analysis instrument if exists the phenomena of leaks and clogs.	yes	Fault replacement
		no	next
9	Check fuel and observe the fault if caused after fueling	Yes	Replace fuel
		no	next
10	Check engine ignition timing if accords with standard.	yes	next
		no	examine and repair ignition timing
11	Check the exhaust gas from muffler if exhausts smoothly	yes	next
		no	Repair or replace muffler
12	Contact with EFI commutator, open ignition switch, check ECU5#、10#、23# stitch, the power whether supply normal or not, check 2#、21# stitch whether is puting up iron or not.	yes	Diagnosis help
		no	Examine and repair relevant wiring